

UNIVERSITY OF MARYLAND  
COLLEGE PARK, MARYLAND

# COMBINED CATALOG

## Volume One

College Park  
University of Maryland



1966-1968



# COMBINED CATALOG

SERIES 1966-1968

---

Volume One

---

COLLEGE PARK  
UNIVERSITY OF MARYLAND

---

*The 1966-1968 Series of University of Maryland Catalogs is published in a two-volume set of combined catalogs. Volume One contains catalogs pertaining to academic units located on the College Park Campus. Volume Two contains catalogs pertaining to academic units located on the Baltimore Campus. This is Volume One.*

---

Catalogs in this volume are located  
in this order:

*Adventure in Learning*  
*(General Information)*

*College of Agriculture*

*College of Arts and Sciences*

*College of Business*  
*and Public Administration*

*College of Education*

*College of Engineering*

*College of Home Economics*

*College of Physical Education,*  
*Recreation and Health*

*Graduate School Announcements*

*Summer School*

*University College*

# *An Adventure in Learning*

*A GUIDE TO THE UNDERGRADUATE PROGRAMS*

The University of Maryland

VOLUME 23

AUGUST 31, 1966

NUMBER 3

UNIVERSITY OF MARYLAND BULLETIN is published three times in July, August and September; twice in January, March, May, June and December; and once in February, April, October and November. Published twenty-three times. Re-entered as second class mail matter under the Act of Congress of August 24, 1912, and second class postage paid at College Park, Maryland.



THIS PUBLICATION IS AN INTRODUCTION TO THE OPPORTUNITIES AND requirements of the University of Maryland. The primary purpose of the University is to help students to develop their talents and capabilities. For those who enroll, it can be an exciting adventure in learning.

We are constantly seeking ways to improve the quality of the University as the quantity increases. One way is to attract able, serious and well prepared students. Your attention is invited to the comprehensive educational program of the University at College Park, Baltimore and Catonsville. We welcome your interest.

*Wilson H. Elkins*

DR. WILSON H. ELKINS  
*President of the University*

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Building,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

HON. MARY ARABIAN

*Municipal Court of Baltimore City, Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

# University Calendar, 1966-67

## *FALL SEMESTER, 1966*

### SEPTEMBER

- 12-16 Monday-Friday—Fall Semester Registration
- 19 Monday—Instruction begins

### NOVEMBER

- 23 Wednesday, after last class—Thanksgiving recess begins
- 28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

- 21 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Tuesday, 8:00 A. M.—Christmas recess ends
- 16 Monday—Pre-exam Study Day
- 17-24 Tuesday-Tuesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

- 30-Feb. 3 Monday-Friday—Spring Semester Registration

### FEBRUARY

- 6 Monday—Instruction begins
- 22 Wednesday—Washington's Birthday, holiday

### MARCH

- 23 Thursday, after last class—Easter recess begins
- 28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

- 10 Wednesday—AFROTC Day
- 24 Wednesday—Pre-exam Study Day
- 25-June 2 Thursday-Friday—Spring Semester Examinations
- 30 Tuesday—Memorial Day, holiday

### JUNE

- 3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

- 26-27 Monday-Tuesday—Registration, Summer Session
- 28 Wednesday—Instruction begins

### JULY

- 4 Tuesday—Independence Day, holiday
- 8 Saturday—Classes (Tuesday schedule)

### AUGUST

- 18 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

- 12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

- 7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

- 5-8 Tuesday-Friday—Firemen's Short Course

# Contents

A Message from the President .....	2
University Calendar .....	4
To the Applicant for Admission .....	7
The University Heritage .....	7
You are the Vital Factor .....	10
Admission to the University .....	12
The Honors Program .....	17
Physical Education .....	19
Air Force ROTC Instruction .....	19
Where Will I Live? .....	21
How Much Will It Cost? .....	23
Extracurricular, Social and Religious Life .....	26
Academic Standards .....	28
Student Life Information .....	29
General Education Program .....	31

## THE UNDERGRADUATE PROGRAMS

College of Agriculture .....	32
College of Arts and Sciences .....	35
College of Business and Public Administration .....	38
College of Education .....	41
College of Engineering .....	43
College of Home Economics .....	45
College of Physical Education, Recreation and Health .....	47
School of Pharmacy .....	49
School of Nursing .....	51
University College .....	53

## APPENDICES

Appendix A. Fees and Expenses .....	55
Appendix B. Honors, Awards, Scholarships and Grants-in-Aid .....	60



# To the Applicant for Admission

THIS BOOKLET IS THE ALL-PURPOSE, GENERAL INFORMATION BOOKLET of the University.

It contains the information you need

- ▶ to arrange your high school curriculum for acceptance by the various colleges of the University
- ▶ to select a course of study at the University
- ▶ to apply for admission
- ▶ to matriculate

*Adventure in Learning* also covers fees and expenses, housing, scholarships and loans.

The course catalog of the College of your choice will be made available to you after you enter the University.

OR

You may consult reference copies in your high school library, principal's office or office of the guidance counselor. Course catalogs usually require interpretation for new freshman students and should, therefore, be used in consultation with the high school guidance counselor or principal.

You may obtain a catalog for the Baltimore County Campus (UMBC), located near Catonsville, by writing to the Registrar, University of Maryland, Baltimore County, 5401 Wilkins Avenue, Baltimore, Maryland 21228.

Professional school catalogs are available by writing to the office of the appropriate dean on the Baltimore campus.

Prospective part-time and evening adult education students may obtain the appropriate course catalog or brochure by writing to the Dean, University College, University of Maryland at College Park.

Prospective graduate students may obtain the Graduate Catalog by writing to the Dean of the Graduate School, University of Maryland at College Park.

Prospective summer students may write to the Director of the Summer Session for copies of the Summer School Catalog—usually available after March 15.

## The University Heritage

FEW INSTITUTIONS OF HIGHER LEARNING IN THE UNITED STATES HAVE had as rich and proud a history as the University of Maryland. Students admitted will find the institution stressing programs of educational excellence, pursuing vital research, and rendering important services to the State.

Just 31 years after the signing of the Declaration of Independence, there was established in Baltimore a College of Medicine, the fifth such medical

school in the United States. The College began with no visible assets save determination, enthusiasm and skill, and the first seven students enrolled received their lectures in the homes of their professors. One member of the faculty, Dr. John Shaw, died as a result of exposure suffered while working winter nights in a dilapidated structure that was the college's home in 1808. The other two members of the faculty, Dr. John Beal Davidge and Dr. James Cocke, were extremely skillful researchers—professionally outstanding in that day and even more so from the perspective of today.

In 1812 the State Legislature authorized the College of Medicine to annex a Faculty of Divinity, a Faculty of Law, and a Faculty of Arts and Sciences. Together these four colleges became the University of Maryland. The college of Divinity and the undergraduate college of Arts and Sciences developed slowly, but highly successful departments of Dentistry and Pharmacy were added, along with a Training School for Nurses. The professional schools of Medicine, Law, Dentistry and Pharmacy were among the half-dozen first of their kind to be established in America, and throughout most of the Nineteenth Century and into the Twentieth Century they were recognized among the foremost schools in each profession.

MEANWHILE, ON THE OLD ROSS BOROUGH ESTATE NEAR WASHINGTON, D.C., a group of wealthy planters were pioneering in an attempt to develop agriculture into an academic discipline.

The Maryland Agricultural College, again one of the two or three first in the country, was established in 1856 on the Ross Borough Estate, just north of Washington. Because it was primarily a school for planters' sons, it suffered greatly during the Civil War, but in 1864 it became a land-grant institution and slowly emerged again, not only as the primary spokesman for the farming interests of the State but as an outstanding undergraduate college. In 1920 the College of Agriculture at College Park was consolidated with the University of Maryland in Baltimore. The merged institution continued under the name of the University of Maryland.

Another division of the University is located on the Eastern Shore. Since its founding in 1886 as the Delaware Conference Academy, Maryland State College has progressed through several designations. Having passed, in 1926, into complete control of the State with the University of Maryland as administrative agency, the College, in 1948 was named Maryland State College, a division of the University of Maryland, with Dr. John Taylor Williams as President.

The instructional program of the College embraces 24 curricular offerings in nine departments—Agriculture, Business, Home Economics, Mechanic Arts, English and Languages, Music, Natural Sciences and Mathematics, Physical Education and Social Sciences. Cooperative baccalaureate and graduate programs exist in nursing and graduate instruction is offered in evening classes leading to advanced degrees in Education.

President Williams has declared that "in giving recognition to the demands of present day society, Maryland State College is a community of dedicated teachers, a wide-awake student body, a strong, virile Alumni Association and an alert, purposeful Board of Regents who have devoted

themselves to a thoughtfully planned program of higher education, from which the citizens of Maryland may receive increasing benefits."

A new campus—The University of Maryland—Baltimore County (UMBC)—began operation in September, 1966. It will accommodate commuting students, primarily from the Baltimore metropolitan area and offer courses in Agriculture, Arts and Sciences, Business and Public Administration, Education, Engineering, Home Economics, Physical Education, Recreation and Health, Nursing and Pharmacy. Late afternoon and evening programs are being developed.

This, of course, forms only the briefest outline of the 157-year history of the University.

Although the University is a State institution quite large in physical plant, student enrollment, the number of courses and degrees offered, and services performed, its objectives remain constant and form a base for all educational activity. Simply stated they are: (1) to prepare students in the arts, the humanities, the pure and applied sciences, agriculture, business and public administration, home economics, industry, and for the professions; (2) to contribute to the civic, ethical, moral, cultural, spiritual, and general welfare; (3) to provide general education in its broadest sense, both formal and informal, for all students who enroll; (4) to develop those ideals and finer relationships among students which characterize cultured individuals; (5) to conduct systematic research and to promote creative scholarship; and (6) to offer special, continuation, and extension education in communities where it is feasible to do so.

The government of the University is vested in a Board of Regents, each member of which is appointed by the Governor of the State to serve a term of seven years. The administration of the University is vested in the President. The following is a listing of the major administrative divisions on both campuses:

#### AT COLLEGE PARK

College of Agriculture	University College
College of Arts and Sciences	Graduate School
College of Business and Public Administration	School of Library and Information Services
College of Education	Department of Air Science
College of Engineering, the Glenn L. Martin Institute of Technology	The Library
College of Home Economics	Computer Science Center
College of Physical Education, Recreation and Health	Summer School
	Agricultural and Home Economics Extension Service
	Agricultural Experiment Station
	Agricultural Services and Controls
	<i>(A School of Architecture will open in 1968.)</i>

#### AT BALTIMORE

School of Dentistry	School of Nursing	University Hospital
School of Law	School of Pharmacy	Psychiatric Institute
School of Medicine	School of Social Work	

THE UNIVERSITY'S EDUCATIONAL AND RESEARCH PROGRAMS ARE ENHANCED by its participation in the activities of the Southern Regional Education Board. The SREB is a public agency supported by the states of Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Through the agency of the SREB, these states work together to advance higher education and to improve the economy of the region.

One program under the Southern Regional Education Board encourages arrangements between institutions whereby high cost educational programs are shared. For example, during the past 15 years Maryland residents have been provided veterinary medical training through a cooperative arrangement with the University of Georgia, and with the Tuskegee Institute. Medical and dental education arrangements have been effected with Meharry Medical College. The University's School of Dentistry, in a similar manner, provides for contract students from certain states where schools of dentistry have not been established. A cooperative program in Forestry has been arranged with North Carolina State. The usual State participation involves paying the out-of-state fee.

## You are the Vital Factor

WHERE DO YOU FIT IN? YOU ARE THE BASIC, VITAL FACTOR IN THE UNIVERSITY'S educational program. It is with you in mind that the citizens of this State (your parents) contribute toward the establishment of a well-equipped University. Much has been done to provide the means for you to acquire an excellent education. You will have an opportunity to fulfill this obligation by diligent application in your studies.

If you are a high school student, or graduate, you are trying, certainly, to decide (1) whether or not to spend the next four years of your life at a college or university and (2) which institution and which course of study is the right one for you.

First you should know that the administration and faculty of the University of Maryland will make every attempt to help you find the answers to these questions. Through personal counseling, letters, and transmittal of information dealing with the academic program, the University attempts to present to the prospective student as complete a picture of its activities as possible. The University is willing to go all the way for you, both during your period of decision and (if accepted for admission) during your academic tenure. Now, here is what the University expects of you.

The University expects you to be a good student; it expects you to be a conscientious student. Even though the University is concerned with a large number of students, emphasis remains on the individual. An estimate of the value of the individual at the University was given by the President of the University, Dr. Wilson H. Elkins, in an address entitled "A Quantity of Quality."



*During the last few decades we have been witnessing a social revolution with the individual as the center, and it is extremely important that this revolution have a clear objective. Otherwise, it could very easily result in a widespread conviction that every one should share and share alike the benefits of a free society regardless of their capacity, effort, initiative, and ambition. Among other things this would lead to the weakening of higher education by the admission and retention of all comers to the campuses of the colleges and universities, and the reduction of our program to a low common denominator. This would be a disservice to society. We must therefore strive to direct the revolution toward the recognition of individual differences while assuring each individual of the opportunity to go as far along various courses as his talents and energies will permit.*

As President Elkins has stated, there are wide and impressively deep educational opportunities offered to each individual at the University of Maryland, but it is up to each individual to prove his own worth and to develop his talents according to his own special capabilities.

WHEN YOU VISIT THE CAMPUS OF THE UNIVERSITY OF MARYLAND AT either College Park or Baltimore, you will recognize a number of major construction projects at various stages of completion. In anticipation of greatly increased enrollments, this condition is expected to continue for at least another decade.

The University possesses some 5,000 acres of land. The main campus at College Park encompasses about 500 acres with 800 additional acres adjacent to it available for agricultural research and teaching. At College Park the principal buildings are designed in a Georgian Colonial style. On the Baltimore City campus, located in the vicinity of Lombard and Green Streets, are situated a number of buildings including the original School of Medicine building constructed in 1812, the Out-Patient Department, the University Hospital, the Psychiatric Institute, the Frank C. Bressler Building, the Dental School Building, Pharmacy School and Nursing School Buildings, the School of Law Building, the Gray Laboratory, the Baltimore Union, and the recently acquired Redwood Hall and Howard Hall. The UMBC campus occupies approximately 450 acres of land in Catonsville, Baltimore County. A classroom building and multi-purpose building will be in use and the library under construction during the fall of 1966 while intensive planning is being carried forth on future science and arts buildings.

The University offices are open Monday through Friday *only* (8:30 a.m. to 4:45 p.m.).

# Admission to the University

NOW YOU ARE LIKELY TO ASK THIS QUESTION: WHO MAY BE ADMITTED to the University?

The University says officially: "Admission from secondary school is based upon evidence indicating the applicant's probable success in the program of his choice."

By the word "evidence" the University means that:

- 1) you must be a graduate of an accredited secondary school;
- 2) your principal or headmaster should recommend you for entrance to the University, attesting to your character and ability;
- 3) you have completed the high school subjects required for the college and curriculum which you wish to enter;
- 4) you have completed the tests of the American College Testing Program<sup>1</sup> and have had the results submitted to the Counseling Center of the University.
- 5) your scholastic average in major subjects in your last two years in high school has been satisfactory.

Actually, during your high school years, you have been preparing for the University. You should have maintained a good scholastic record and planned your curriculum so that you will have at graduation the required number of units to begin your college program.

All applicants for admission, who do not qualify as Maryland residents, as defined in the Appendix, must also have the results of the American College Testing Program and complete high school records submitted to the Admissions Office. Only a limited number of well-qualified out-of-state applicants can be considered for admission since first preference is given to Maryland residents.

## *Advanced Placement Program*

Students entering the University from secondary school may obtain advanced placement and college credit on the basis of their performance in the College Board Advanced Placement examinations. These examinations are normally given to eligible high school seniors during the May preceding matriculation in college.

For achievement of a score of five or four on a given examination, the student will be granted Advanced Placement and the credit equivalent of two semester courses in that field; for achievement of a score of three, Advanced Placement and the credit equivalent of either one or two semester courses, depending upon the field of the examination, will be granted. Students earning this credit and placement need not do additional work in the subject.

The program allows students a maximum of thirty hours credit, which may be used to meet major, minor, or elective requirements; or, where appropriate, General Education requirements. Included in the University's program are Advanced Placement examinations in the following areas: Biology, Chemistry, Classics, English, History, Mathematics, and Physics.

---

<sup>1</sup>Consult your high school counselor for information about the American College Testing Program.

Questions about the program may be addressed to the Director of Admissions and Registrations, College Deans, or the Director of General Education. For detailed information about examinations and procedures in taking them, write to Director of Advanced Placement Program, College Entrance Examination Board, 475 Riverside Drive, New York, New York 10027.

### *Pre-College Summer Session*

Any Maryland resident whose scholastic average in major subjects for his junior year in high school and the first semester of the senior high school year falls below the C level will be required to attend the University Pre-College Summer Session.

The Pre-College Summer Session is held at College Park, Maryland, and is preceded by a brief orientation period. During this session, which runs concurrently with the regular University Summer Session, students will be required to take a full academic workload, including English 1. A special program of advisement and counseling as well as reading and study skills instruction will be provided. Alternatives to this special session, and the achievement required to remain in the University, have been explained to Maryland high school principals and counselors and are contained in a special brochure sent to students required to attend the Pre-College Summer Session.

A student whose average falls below C as noted above MUST HAVE HIS APPLICATION AND HIGH SCHOOL RECORD INCLUDING HIS FIRST SEMESTER SENIOR GRADES IN THE ADMISSIONS OFFICE AT COLLEGE PARK BY OR BEFORE MAY 1, 1967 TO BE CONSIDERED FOR ADMISSION. The American College Test results for students with less than C average must be received by May 19, 1967.

### *How about Mathematics?*

All programs in the University require some college work in mathematics. The student who plans to go to college should be sure to take College Preparatory Mathematics for three and preferably four years. Some programs in the University, for example Engineering, require from three and one-half to four years of College Preparatory Mathematics.

*Courses in General Mathematics, Commercial Mathematics, and Shop Mathematics are not considered as College Preparatory Mathematics.*

### *How about English?*

A considerable portion of the work in English during the freshman year at the University is devoted to expository writing. The high school student should therefore get as much preparation as possible in composition. The student who passes the English Classification test in the top ten percent of his entering class will be placed in an advanced English grouping.

### *Where do you apply?*

The Office of Admissions is chiefly responsible for advising prospective students prior to application for admission and for processing applications when submitted. All inquiries concerning undergraduate work, therefore, should be submitted to:

DIRECTOR, OFFICE OF ADMISSIONS  
NORTH ADMINISTRATION BUILDING  
UNIVERSITY OF MARYLAND  
COLLEGE PARK, MARYLAND 20740

In your first letter of inquiry you should state your educational background and your expected date of graduation from secondary school, your educational objectives, and the date of your expected entrance to the University. You should request application forms for admission. It is not essential that you receive a course catalog for the College in which you are interested prior to your registration. Maryland high schools are supplied with application blanks upon request. Therefore your high school counselor may have application blanks on hand.

Part I of your application, accompanied by a \$10 application fee, should be returned to the Office of Admissions at any time after October 1 of your senior year in high school. The fee should be in the form of a check made payable to the University of Maryland and is non-refundable under any circumstance. The fee will be applied in lieu of the matriculation fee provided the applicant enrolls for the term applied for on his application. Applicants who have been enrolled with the University of Maryland in its Evening Division at College Park or Baltimore, or at one of its off-campus centers are not required to pay the fee since they have already paid a matriculation fee.

In presenting your address, you must include your ZIP CODE. Failure to do so will cause considerable delay.

### *Deadlines for Applications*

#### FALL SEMESTER

All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before June 1. Any student registered for nine or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between June 1 and July 15. Applicants for full-time attendance filing after June 1 will be required to pay a non-refundable \$25 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission, must be received by the appropriate University office by July 15. This means that the applicant's educational records, (except current summer school grades) ACT scores (in the case of new freshmen) and medical examination report must be received by July 15.

## SPRING SEMESTER

The deadline for the receipt of applications for the Spring Semester is January 1.

### *Orientation Programs*

#### I. THE OFFICIAL NEW FRESHMEN ORIENTATION AND REGISTRATION PROGRAM

Upon final admission to the University you will receive materials pertaining to your participation in The Official New Freshmen Orientation and Registration Program for the University of Maryland. The program is operated at the College Park Campus during the months of June, July, and August. You will attend with a group of your future classmates. During the two days here, you will engage in the following:

1. Formal and informal discussions about University life, the standards the University will expect from you and what you can expect from it.
2. A personal conference with a faculty adviser in your college who will assist you in selecting and registering for Fall semester courses.
3. A personalized introduction to campus facilities, sources of help for the problems the typical freshman must face, and out-of-class opportunities.
4. Payment of Fall Semester bills and purchase of your text books if you so desire.

#### II. NEW STUDENT WEEK

During the last three days of Fall Registration week, students and faculty combine their efforts to plan a program of value and interest for you. The President of the University delivers his personal message to new students and their parents and greets each new student. Outstanding faculty personnel participate in a series of programs designed to initiate the academic year. Social programs are planned to help you further your contacts with your classmates. Student governing bodies present programs to further acquaint you with the structure of student government and you have an opportunity to meet the people who represent you. Representatives of religious groups and other student organizations are available to explain the nature of their programs. A special program for parents is planned for the evening of the first day of New Student Week.

### *The Transfer Student*

A student must be in good standing as to scholarship and character to be eligible for transfer to the University. Advanced standing is assigned to a transfer student from an accredited institution under the following conditions: (1) A minimum of one year of resident work or not less than 30 semester hours (including the meeting of all University and curricular requirements) is necessary for a degree; (2) The University reserves the right to make the assignment of transfer credit conditional upon the stu-

dent's making a satisfactory record during his first semester at the University; (3) The University reserves the right to revoke advanced standing if the transfer student's progress is at any time unsatisfactory. The transfer student may obtain a course catalog from the dean of the college in which he will enroll.

### *The Special Student*

An applicant who is twenty-one years of age and who has not completed the subjects required for admission may be admitted to such courses as he seems qualified to take. A special student is ineligible to matriculate for a degree until he has satisfied the entrance requirements. A special student may also be one who meets entrance requirements but who does not wish to pursue a program of study leading to a degree.

### *The Foreign Student*

The foreign student applying for admission to the undergraduate schools of the University of Maryland should make application at least six months in advance of the term for which he is applying. He will be required to submit an application for admission on a form furnished upon request by the Admissions Office of the University, and official copies of his secondary school preparation, certificates of completion of state secondary school examinations, and records of college or university studies completed in schools in the United States or elsewhere. He will also be required to furnish proof of his ability to read, write, speak, and understand English sufficiently well to pursue satisfactorily an approved course of study in one of the colleges of the University. Arrangements can be made through the office of the Foreign Student Adviser for administering an English test to prospective students both in the United States and in countries abroad.

The foreign student accepted for admission to the University will receive the Immigration I-20 form needed to secure a student visa from the American consul.

Every foreign student is expected to notify the Foreign Student Adviser as to the approximate date of his arrival at the University and arrange to see him as soon as possible after arrival. The office of the Adviser is located in the North Administration Building, Room 222.

## The Honors Program

IN ORDER TO CHALLENGE THE CAPACITIES OF THE SUPERIOR STUDENT, the College of Arts and Sciences has instituted both General and Departmental Honors. General Honors, as its name suggests, enlarges the breadth of the student's generalized knowledge; Departmental Honors increases the depth of his knowledge of his major discipline. Each year a selected group of entering Freshmen are invited into the General Honors Program on the basis of their high school records and standings, together with their scores in tests such as ACT, SAT, and CEEB. The General Honors student,

after acceptance, must maintain a cumulative grade point average of at least 3.0 for continuance in the Program; he is permitted to drop General Honors, if he so wishes, at the end of any semester. The General Honors Program accepts the basic thesis of a generalized liberal education, and in addition emphasizes the possibilities of interrelatedness among branches of knowledge and the toleration of different points of view. Always the attempt is to urge the student toward an independent yet responsible mode of inquiry among the general ideas which underlie human culture.

During his first two years at the University, the student registers in General Honors sections of General Education required courses. Such sections are kept small, the work is adjusted to the natural speed of the group, and wherever possible, a discussion method is employed in the classroom. Beginning on the Sophomore level and continuing through the Senior level, special General Honors seminars and colloquia of an experimental and interdisciplinary nature are arranged for the GH student. Some of these courses may be taken as substitutes for General Education required courses, others may not, but in any case all are taken on a voluntary basis.

The Departmental Honors Programs ordinarily begin in the Junior year, although a few Programs begin as early as the Freshman year. Almost every Department in the College maintains an Honors Program for its majors. Although many General Honors students choose to enter Departmental Honors, there is no requirement either that the General Honors student should continue into Departmental Honors, or that the Departmental Honors student should be exclusively recruited from the ranks of the General Honors students. Very broadly, it is required that a student, if he wishes to enter Departmental Honors, should have a 3.0 grade point average in all of his academic subjects and at least a 3.5 average in his major. Entrance is by invitation from the Departmental Honors Committee, and successful completion of the Program is noted by the phrase "Graduated with Honors (or High Honors)" on the student's diploma and on all official transcripts of his University record.

Departmental Honors Programs differ widely in structure, but all require of the student an Honors thesis and an oral examination. Departmental Honors work is characterized by independent readings and research, small seminars or colloquia, and by a marked intensification of effort in the major discipline. Such work is, in effect, a preparation for graduate school, and successful participants in such Programs are encouraged to continue toward the higher degrees.

The work of the Honors Programs is coordinated by a Director of Honors Programs and is overseen by an Honors Committee composed of representatives from each department of the College. For further information concerning the Honors Programs, write the Director of Honors Programs, Office of the Dean of Arts and Sciences.

# Physical Education and Health

THE UNIVERSITY IS CONCERNED WITH THE PHYSICAL FITNESS OF EACH student. Therefore, all undergraduate men and women students, classified academically as freshmen registered for more than six semester hours of credit, are required to enroll in and successfully complete two prescribed courses in Physical Education for a total of two semester hours of credit. These courses must be taken by all eligible students during their first year of attendance at the University whether they intend to graduate or not. A health course of two semester hours' credit is required of all undergraduate men and women.

## Air Force ROTC Instruction

THE UNIVERSITY OF MARYLAND OPERATES ONE OF THE LARGEST Air Force Reserve Officer Training Units in the United States. ROTC is offered on a completely elective basis. Its curriculum is generalized, consisting of courses designed to produce citizens and officers with well-rounded backgrounds.

### *Two Programs Offered*

The University offers incoming students a choice of a two-year or a four-year program. Successful completion of either program qualifies the student for a commission in the Air Force upon graduation.

I. THE TWO-YEAR PROGRAM: Students who have at least two years of college remaining before the award of their degree (either at the baccalaureate or the graduate level) are eligible to apply for the two-year program. Although the two-year program is designed particularly for junior college students and other male students who transfer to Maryland from colleges without an ROTC program, it is open to all eligible men attending the University of Maryland. Evaluation of candidates is completed during the first semester of the sophomore year, since each student must meet physical and mental standards set by the Air Force. Also, the law requires that students in this program attend a six-week field training course at a designated Air Force Base during the summer preceding initial entry into the two-year academic portion. Many of the young men starting college at the University of Maryland will not be able to select this program because of their need to earn money in the summer months to remain in college. Those in this category may choose the four-year program.

II. THE FOUR-YEAR PROGRAM: A general military course (formerly basic course), comprising the first two years, is offered for freshmen and sophomores. The Professional Officer Course (formerly the advanced course), comprising the last two years, is for those students who have successfully completed the general military course. Admission into the Professional Officer Course is available to selected students only. An advanced student in the four-year program must attend four weeks of summer train-

ing at an active Air Force Base during the summer after completing his junior year of college. Whenever necessary, however, this training may be delayed until the summer following the senior year. The law provides that only ROTC cadets in the four-year program are eligible for consideration for the full scholarships available each year.

### *Financial Assistance For AFROTC Students*

I. FULL SCHOLARSHIPS: This program will provide full scholarships for 2,000 cadets in the four-year AFROTC program in 1966-67 on a nationwide basis. Cadets receive money for tuition, fees, books, and laboratory expenses for up to eight semesters. In addition, they will receive retainer pay of \$50 per month. This year the Air Force will award all scholarships to juniors and seniors presently in the AFROTC program.

II. PARTIAL SCHOLARSHIP: (Retainer Pay): All juniors and seniors in the Professional Officer Course not selected for full scholarships will receive retainer pay of \$40.00 per month for 10 months in the junior year and 10 months in the senior year. Payment is made quarterly. This allowance of \$400 per year is paid in addition to any benefits authorized by the GI Bill of Rights.

### *AFROTC Flight Instruction Program*

Under the Flight Instruction Program, senior AFROTC cadets who desire to become pilots in the United States Air Force are given the opportunity to obtain training leading to a Private Pilots license in a light airplane. They are given 36½ hours of flight instruction by a civilian flying school under contract to the Air Force. In addition, they receive 35 hours of ground instruction by members of the Department of Air Science.

## AIR SCIENCE DEPARTMENT

### *THE CURRICULUM*

#### TWO COURSES

Air Science is divided into two parts: the first two years are called the General Military Course and the last two years are called the Professional Officer Course.

#### FRESHMAN YEAR, AS 11 AND AS 12

These courses meet twice each week throughout the year. One hour per week is in the classroom and one hour is used for Leadership Laboratory (practical training or drill). Academic material covered includes: Causes of World Conflict; The Role of Military Power in Conflict; Responsibility of Air Force Officers; and Military Systems of the World.

#### SOPHOMORE YEAR, AS 21 AND AS 22

These courses meet twice each week throughout the year. One hour per week is in the classroom and one hour is used for Leadership Laboratory

(practical training or drill). Academic material covered includes: Study of World Military Forces; Political-military Issues; and Trends and Implication of World Military Power.

#### JUNIOR YEAR, AS 101 AND AS 102

This course, entitled The Growth and Development of Aerospace Power, requires three class hours and one hour Leadership Laboratory per week. It is a survey course about the Nature of War; Development of Air Power in the United States; Mission and Organization of the Defense Department; Air Force Concepts, Doctrine, and Employment; Astronautics and Space Operations; and Future Development of Aerospace Power. The United States space programs, vehicles, systems, and problems of space exploration are also studied.

#### SENIOR YEAR, AS 103 AND AS 104

This course is called The Professional Officer. It requires three class hours and one hour Leadership Laboratory per week. Course material includes the Military Justice System; Advanced Leadership Theory, Functions and Practices; Management Principles and Functions; and Problem Solving.

## Where Will I Live?

### *Residence Halls*

TRAINED PERSONNEL ARE EMPLOYED BY THE UNIVERSITY TO ASSIST students to administer the residence halls program. These members of the staff, living in the various residence units, are interested in helping students to derive the maximum benefit from the academic, cultural, social and athletic opportunities which are available in group living.

If the student desires living accommodations in a residence hall, he must complete the following steps:

1. Apply for admission to University.
2. Receive notification of admission to University and submit Housing Application, enclosed with admission letter.
3. Receive additional information about: (a) room assignment priority, (b) conditions of residence hall contract, (c) University rules and regulations, (d) room deposit, and (e) room equipment.

Only single undergraduate students may live in the residence halls. Women students applying for housing for the first time and women students being readmitted to the University who will be 21 years of age or older at the time of registration for classes will not be given residence hall accommodations. There are no age restrictions for men in the residence halls. Both men and women students who elect to live off-campus may do so. The selection and choice of an off-campus facility are the responsibility of the student and his parents or guardian.

### *Off-Campus Housing*

Upperclassmen and veteran male undergraduate students are allowed to live in houses off-campus. Graduates and new undergraduate women 21 years of age or older must live off-campus. A list of rooms, apartments and houses available to all persons associated with the University is located in the Housing Office on the third floor of the North Administration Building. Most of the off-campus houses have double rooms with twin beds and provide linens and towels. Some require that you furnish your own bed linens. The price for a person in a double room is about \$25 a month. Single rooms rent from \$30-\$50 per month.

### *Family Housing Units*

The University maintains a limited number of unfurnished married housing units on the campus. Efficiency units for families with no children rent for \$42.50 per month and consist of a living room-bedroom combination, kitchen and bath. One bedroom units are for families with one child and rent for \$45.50 per month.

To be eligible, undergraduate students must take at least 15 hours credit per semester. Graduate students, other than those with teaching fellowships and assistantships, must take 10 hours credit per semester. To be eligible a student's income must not exceed \$4,500 per year. Units are not available to families with more than one child, and the child cannot be over five years of age. A student must be officially admitted to the University before his application can be considered active. Applications for these units may be obtained from the Housing Office.

### *IMPORTANT NOTICE*

THE STATEMENTS IN THIS BOOKLET ARE FOR INFORMATION ONLY. The provisions of this publication *do not* form a contract between the student and the University of Maryland.

Official notice concerning student life, grading systems and other regulations are to be found in the publication *University General and Academic Regulations*, made available to all incoming students.

The University reserves the right to change any provision or requirement at any time within the student's term of residence. The University further reserves the right, at any time, to ask a student to withdraw when it considers such action to be in the best interests of the University.

### *Lord Calvert Apartments*

The Lord Calvert Apartments in College Park were acquired by the University to alleviate the critical need for housing for married students. Intended primarily as a housing facility for married graduate teaching assistants who are employed in the instructional programs at College Park, the Lord Calvert complex offers units with one bedroom and dining alcove; one bedroom and dining room, and two-bedroom units with dining rooms.

## How Much Will It Cost?

THE FOLLOWING TABLE PRESENTS ESTABLISHED CHARGES FOR ATTENDING the University of Maryland in the undergraduate programs offered on the College Park campus.

### **Fees for Undergraduate Students**

<b>Maryland Residents</b>	<b>First Semester</b>	<b>Second Semester</b>	<b>Total</b>
FIXED CHARGES .....	\$140.00	\$130.00	\$270.00
INSTRUCTIONAL MATERIALS FEE .....	12.00	12.00	24.00
ATHLETIC FEE .....	20.00	...	20.00
STUDENT ACTIVITIES FEE .....	12.00	...	12.00
SPECIAL FEE .....	15.00	...	15.00
RECREATIONAL FACILITIES FEE .....	25.00	...	25.00
<b>Total for Residents</b>	<b>\$224.00</b>	<b>\$142.00</b>	<b>\$366.00</b>

### **Residents of the District of Columbia, Other States and Countries**

TUITION FEE FOR NON-RESIDENT STUDENTS .....	\$200.00	\$200.00	\$400.00
<b>Total for Non-Residents</b> .....	<b>\$424.00</b>	<b>\$342.00</b>	<b>\$766.00</b>

### **Board and Lodging**

BOARD .....	\$220.00	\$220.00	\$440.00
LODGING			
MARYLAND RESIDENTS .....	\$160.00	\$160.00	\$320.00
OTHER STATES AND COUNTRIES .....	\$210.00	\$210.00	\$420.00 <sup>a</sup>

<sup>a</sup>All students who live in the residence halls must take their meals in the University Dining Halls.

For complete information concerning fees see Appendix A.

### *How About Grants and Scholarships?*

For promising young men and women who might not otherwise be able to provide themselves an opportunity for higher education, a number of grants and scholarships are available. New students must apply before

March 15. Students already enrolled may apply before May 1. All requests for information concerning these awards should be directed to:

DIRECTOR, STUDENT AID  
UNIVERSITY OF MARYLAND  
COLLEGE PARK, MARYLAND 20740

In deciding whether you are eligible to receive a grant or a scholarship, the Committee considers such qualifications as leadership, character, achievement, and participation in student activities, as well as academic ability and financial need. Recipients must register for a minimum of fourteen semester hours of credit.

You should know of the major groupings of grants and scholarships. These are:

FULL UNIVERSITY SCHOLARSHIPS—covering board, lodging, fixed charges, fees and books;

UNIVERSITY GRANTS—awarded to deserving and qualified secondary school graduates covering fixed charges only;

GENERAL ASSEMBLY GRANTS—for fixed charges only, awarded by members of the State Legislature, three for each Senator and one for each member of the House of Delegates, only to persons in the county or in the legislative district of Baltimore City which the Delegate or Senator represents;

SPECIAL ACADEMIC SCHOLARSHIPS—awarded to students of exceptional academic ability;

EDUCATIONAL OPPORTUNITY GRANTS—awarded to students of exceptional financial need from funds made available from the Federal government. Awards range from \$200 to \$800 per year and must be matched by other institutional aid.

ENDOWED SCHOLARSHIPS AND GRANTS—supported by income from funds especially established for this purpose;

TEACHER EDUCATION GRANTS—for fixed charges only, available to Maryland residents who agree to teach in Maryland public school for two years;

GENERAL STATE TUITION SCHOLARSHIPS—for fixed charges only, awarded by the State Scholarship Board on the basis of an examination.

### *Can You Work Your Way Through College?*

A number of students are employed on a part-time basis by the University, others work in various capacities in shops and stores located in the College Park area. If you seek employment while pursuing a regular program of instruction, you should consult the Office of Student Aid which maintains a listing of available jobs within the University and in nearby commercial areas, including holiday and summer employment.

### *Are Loans Possible?*

Several loans are made available by private organizations to worthy students in financial need.



Under provisions of United Student Aid Funds, qualified students may borrow up to \$1000 per year from home-town banks.

Under the will of Catherine Moore Brinkley, a loan fund is available for worthy students who are natives and residents of Maryland.

Under provisions of the National Defense Education Act, loans are available to qualified students in amounts not to exceed \$1000 per year.

### *Teacher Education?*

In order to provide a greater supply of qualified teachers for the public schools of Maryland, residents of Maryland may have fixed charges remitted while pursuing successfully a teacher preparation program.

The following conditions pertain to the administration of the program:

1. The student must be a resident of the State of Maryland as defined in this publication. This resident status must be maintained in order to continue the effectiveness of the agreement.
2. The student must be a citizen of the United States of America.
3. The student must be regularly admitted to the University for the pursuit of a baccalaureate degree.
4. The student must be enrolled as a full-time student pursuing a curriculum leading to teacher certification in accordance with University regulations. Fifteen semester hours of credit shall constitute a full-time schedule for persons who have their fixed fees remitted at the University of Maryland.

Each applicant eligible to participate in the reimbursed program will be required to sign a pledge to teach in the public schools of Maryland for a period of two years, immediately following graduation. A reimbursement agreement must be signed to cover the contingency of not satisfying the teaching requirement. A more detailed explanation is available upon request.

Persons enrolled in the summer session or in any of the later afternoon and evening programs are not covered by this fee remission program.

## Extra-curricular, Social and Religious Life

ORGANIZED STUDENT ACTIVITIES ARE RECOGNIZED AND ENCOURAGED as aids in the development of leadership and citizenship skills. There are over three hundred officially recognized special interest clubs, civic groups, service organizations, professional organizations, recreational organizations, religious clubs and musical clubs available for students at College Park. You may be interested in joining one of the many preforming groups or the staff of one of the student publications. You may be also interested in affiliating with one of the social fraternities or sororities or taking part in a resident hall dormitory government, or interested in becoming a member of a club or society which has a primary interest in the informal investigation of an academic specialty. Also available is an extensive intramural athletic program, both for men and women.

The Student Government Association represents all students under an approved constitution and by-laws. The Student Government Association has represented on its Cabinet four at-large members, the president and vice-president of the Residence Hall Council, the president of Inter-Fraternity Council, the president of Pan-hellenic Council, president of the University Commuters Association, president of Associated Women Students, Men's League, and the four class presidents. Other branches of the Student Government are the Legislature and the Student Courts, both making major contributions to the functioning of Student Government at the University.

The University Band is under the supervision of the Department of Music and is composed of four groups: the Marching Band, the Symphonic Band, the Air Force ROTC Band, and the Pep Band.

Six student communications and publications media are operated with faculty guidance and the general supervision of the Committee on Student Publications and Communications. They are: *The Diamondback*, the campus newspaper; *The Terrapin*, the student yearbook; *The M Book*, the student handbook; *Argus* and *Calvert Review*, campus literary magazines; and WMUC, the campus radio station.

### *Athletics and Recreation*

The University recognizes the importance of the physical development of all students and, in addition to the required physical education for freshmen and sophomores, sponsors a comprehensive intercollegiate and intramural program. Students are encouraged to participate in competitive athletics and to learn the skill of games that may be carried on after leaving college. The intramural program, which covers a large variety of sports, is conducted by the Physical Education Department for both men and women.

The Council on Intercollegiate Athletics sponsors and supervises a full program of intercollegiate athletics in every form necessary to meet the needs of the student body. This program is an integral feature of University life. Each student is encouraged to participate in the program, either as an athlete or as a spectator. A strong intercollegiate program creates the incentives for extensive participation in the intramural program and, further, the program furnishes a rallying point of common interest for students, alumni, and faculty.

The University is a member of the Atlantic Coast Conference, the National Collegiate Athletic Association, the United States Intercollegiate Lacrosse Association, the Intercollegiate Amateur Athletic Association of America, and cooperates with other national organizations in the promotion of amateur athletics.

The University has an activities building which contains a modern gymnasium, a swimming pool, training facilities for indoor sports, physical education laboratories, and an arena; also a large armory; a modern stadium with a running track; a number of athletic fields; tennis courts; golf course; baseball diamonds; and a gymnasium and swimming pool for women.

## *To Round Out Your Experiences*

The Student Government Association's cultural committee, University Theatre and musical groups present a broad program of musical, cultural and dramatic programs. Recent talent brought to the campus by these groups were: the Robert Shaw Chorale, Carlos Montoya, the Music of Richard Rodgers, Stan Getz, The Establishment, Kia Winding, Ferrante and Teicher and Hal Holbrook. Contemporary entertainment is presented throughout the year by various student organizations. Also available in the Student Union is an extensive film series, both classical and foreign, a speaker series, dances and special programs. The National Symphony presents a series of concerts during the year.

Campus or class-wide social events are associated with Homecoming and the Freshman, Sophomore, Junior and Senior Proms. Name bands such as Les and Larry Elgart, Warren Covington, Tommy Dorsey and Lester Lanin have appeared at these affairs.

Fraternities, sororities, and residence halls also sponsor social events throughout the year, including exchange socials and open houses from time to time.

The All-Faiths Memorial Chapel is one of the most beautiful structures of its kind in the nation. Within its shelter are housed the offices of chaplains, representing the denominational bodies, and there are many opportunities for you to consult with the ministers of your faith. Chances are that you will want to join a religious club such as the Baptist Student Union, Canterbury Association (Episcopal), Christian Fellowship (non-denominational), Christian Science, Diogenes Society (Unitarian), Ethos (Eastern Orthodox), Hillel Foundation (Jewish), Lutheran Students Association, Newman Club (Roman Catholic), Westminster Foundation (Presbyterian), and the Wesley Foundation (Methodist).

## Academic Standards

THE STUDENT WHO MAINTAINS AT LEAST A "C" AVERAGE IN ACADEMIC subjects is proceeding satisfactorily toward graduation. The student who does not maintain this average is falling behind.

The regulations governing minimum requirements for retention and graduation are printed in a separate publication, *University General and Academic Regulations*. Every student should familiarize himself with these regulations. If a cumulative grade point average is not maintained, as defined in the regulation, the student is placed on probation or is dismissed.

High school students who have an average of less than "C" in their academic subjects, as specified by the Director of Admissions, will be required to attend the Pre-College Summer Session prior to acceptance by the University of Maryland.

# Student Life Information

## *Health Services*

THE UNIVERSITY RECOGNIZES ITS RESPONSIBILITY FOR SAFEGUARDING the health of its students. All new, full-time, graduate and undergraduate students are required to submit a record of a current, thorough physical examination prior to their admission, and to pay the annual Health Service Fee. A new, well-equipped and staffed health services facility is available for the treatment of sick or injured students who have paid the Health Service Fee.

In addition, excellent commercial accident and sickness insurance sponsored by the University is available. This insurance is voluntary for domestic students; however, all foreign students are required to have this type of insurance in reasonable amounts.

All dormitories, off-campus houses, sorority and fraternity houses, the Food Service and certain other areas are inspected periodically by the Student Health Service to make certain that proper sanitary conditions are maintained.

## *University Counseling Center*

The Counseling Center is a University-wide service available to all students. It is devoted to counseling of students, consultations with faculty and others concerned with student welfare, and is involved in research, teaching and counselor training. The staff of the Center is composed of psychologists and educational specialists particularly trained to accomplish these purposes.

The Counseling Center assists students interested in gaining a better understanding of themselves and/or resolving concerns of a vocational or educational nature. Both individual and group methods of counseling are used. Where psychological testing is appropriate in the counseling of students, tests of ability, interest and personality are employed.

Through its Reading and Study Skills Laboratory, the Center provides an extensive program for students motivated to improve their reading and listening skills, study methods, vocabulary and/or spelling.

Students are entitled to the services of the Center without charge since they annually pay an advisory and testing fee at the time of registration.

The Counseling Center is located in the Shoemaker Building.

## *Placement and Credentials Service*

The University's Placement Service fosters student career development. The Service is the primary center through which students and alumni may contact prospective employers in a wide variety of fields about employment.

The Placement and Credentials Services are located in the Shoemaker Building.

### *University Post Office*

The University operates an office located in the Service Building, for the reception and dispatch and delivery of the United States mail, including parcel post items and inter-office communications. This office is not a part of the U. S. postal system and no facilities are available for the reception or transmission of postal money orders. All registered and insured mail must be picked up at the United States Post Office in the City of College Park. The campus post office hours are 8:30 a.m. to 4:00 p.m., Monday thru Friday. Resident students' mail will be delivered directly to the dormitories. All communications addressed to non-resident and/or commuting students must be mailed to their home addresses as there is no provision in the University Post Office for handling mail for these students.

### *The Student Union*

The enlarged and improved Student Union has much to offer the student and faculty in facilities and services.

The cafeteria, with seating for approximately 450, offers a complete line of hot lunches and dinners served daily from 11:00 a.m. to 2:00 p.m. and 4:45 p.m. to 7:30 p.m. The remodeled snack bar serves breakfast and light lunches plus snacks throughout the day from 7:00 a.m. to 10:30 p.m.

The Student Supply Store makes available for University personnel all classroom needs in texts and supplies plus an assortment of clothing, cards, novelties and jewelry.

The tobacco shop can fill almost any smoking need. Candy and personal articles are available here.

During out-of-class hours students enjoy functions and activities sponsored by the Student Union Board. These activities include an up-to-date and popular selection of films shown Friday through Sunday evenings in the air-conditioned ballroom and a selected number of classical films shown on Thursdays, twice monthly. A Speakers Series brings many well-known personalities to the campus; the Spotlight Series brings favorite musical and comedy attractions. There are opportunities to meet University faculty members during one of the monthly Student-Faculty Coffee Hours. Students examine the monthly art exhibit in the Fine Arts Lounge where student and faculty works as well as works of other well-known exhibitors are on view. One of the most popular activities sponsored by the Student Union Board are the twice monthly dances. These feature favorite bands and the dress is generally casual.

You may find relaxation on one of the Union's 16 automatic ten pin bowling lanes which are open from 9:00 a.m. to 11:00 p.m. daily and slightly later on the weekends. Or perhaps you might enjoy a game of billiards in the new 12 table billiard room. Chess and bridge are also available; these University clubs meet regularly in the Union.

There is a check cashing facility in the main office where personal checks up to \$10.00 may be cashed Monday through Friday from 9 a.m. to 3:00 p.m. for a small service charge. Ditto or mimeographing needs may be

obtained here for a nominal cost. A Union poster service, providing a variety in printed signs, may also be utilized for a small cost. Student tickets for campus events are available in the Union ticket booth, located in the main lobby.

University-recognized organizations or clubs may meet in any of the many rooms of varying size; a reservation form should be completed in the Union Office several days in advance. Light refreshment is available, but no food may be brought into the building.

The Student Union also has for use outside of the building at a small rental fee, such items as 16mm sound movie projectors, screens, P.A. systems, slide projectors, certain kitchen equipment such as three and five gallon thermos jugs, and silver service.

The hours of operation listed here for any of the facilities of the Student Union are subject to change without notice depending on the needs of operating efficiency.

## General Education Program

A COLLEGE EDUCATION IMPLIES SOMETHING MORE THAN A TECHNICAL training in a field of specialization. In order that each graduate may gain a liberal education as well as a specialized one, the University has established a General Education Requirement. This requirement consists of 34 semester hours of credit in six areas: English (9 hr.), Fine Arts or Philosophy (3 hr.), History (6 hr.), Mathematics (3 hr.), Science (7 hr.), and Social Science (6 hr.). There is a wide choice in specific courses which may be used to satisfy requirements in all of the six areas except English. Physical Education and Health requirements for all students are taken in addition to this 34-hour group of courses.

It should be emphasized that the 34 semester hours of General Education courses constitute a minimum University requirement, applicable to all students who entered college after June 22, 1964. Individual Colleges within the University may add supplementary requirements.

The General Education Program is designed to be spread out over the four years of college. No General Education course requires any prior college course as a prerequisite. Thus, a student may (within limits of his particular curriculum) satisfy a General Education requirement with any available course for which he is eligible by advanced credit, placement examination, department evaluation, and class standing.



## COLLEGE OF AGRICULTURE

THE COLLEGE OF AGRICULTURE OFFERS A NUMBER OF CURRICULUMS TO prepare students for a wide variety of rewarding careers. These curriculums prepare the student for useful, informed citizenship with a basic understanding of science in general and the science of agriculture in particular. All four-year programs lead to the Bachelor of Science degree.

Modern agriculture is a highly complex and extremely efficient industry which includes supplies and services used in agricultural production, the production process itself, and the marketing, processing and distribution of food and related products to meet the needs and wants of consumers.

Instruction in the College of Agriculture emphasizes the fundamental sciences and associated areas of knowledge that its graduates must use in the agriculture of the future. When necessary, course programs in specialized areas may be tailored to fit the needs of the student.

Previous training in agriculture is not a prerequisite for enrollment. Career opportunities for men and women with rural, suburban, or urban backgrounds are numerous in agriculture and its allied industries.

Graduates of the College of Agriculture have a broad base for rewarding careers and continued learning after college in business, production, teaching, research, extension and other professional fields. Students may major in Agricultural Chemistry, Agricultural Economics, Agricultural Engineering, Agricultural and Extension Education, Agronomy, Animal Science, Botany, Dairy Science, Entomology, Food Science, Horticulture, Poultry Science, General Agriculture and Pre-Professional Programs. Some of the careers which graduates of specific curriculums may select are:

**ANIMAL, PLANT AND SOIL SCIENCE.** Animal, plant and soil scientists utilize the principles of nutrition, physiology, breeding and selection, management, sanitation, and insect and disease control in producing quality

plants and animals in sufficient quantities and varieties to meet effectively and efficiently the needs of consumers. Curriculums in animal, plant and soil science combine a sound basis in fundamentals with specialized area options to prepare individuals for the wide range of careers in the many aspects of the production, management, sales, research, teaching and extension.

**FOOD SCIENCE.** The food scientist applies the fundamentals of chemistry, physics, microbiology, sanitation, nutrition, management, and quality control to the problems of procurement, processing, packaging and marketing of nutritious and aesthetically satisfying foods. Graduates in food science are trained in the basic sciences and associated subjects for careers in production, management, research, product development, quality control, teaching, extension, marketing, human nutrition and personnel relations in the food processing industry.

**AGRICULTURAL ECONOMICS.** The agricultural economist deals with the application of economic principles to the many facets of the total business of agriculture and other industries and occupations. He applies a knowledge of economics, mathematics, statistics, business management, finance, accounting, and agricultural science to the challenging opportunities found in the agricultural supply and service, production, and marketing industries. He may become a professional manager, and apply his knowledge to the fields of production economics, the agricultural marketing system, the operation of supply firms or service organizations. He may become a market analyst, researcher, teacher, extension worker, agricultural statistician, agricultural credit specialist, foreign trade representative, or one of a growing list of professional occupations in government and industry which utilize his knowledge. As agriculture becomes more scientific, more efficient, more specialized, more competitive, the agricultural economist will be faced with an increasingly important future role.

**AGRICULTURAL ENGINEERING.** The agricultural engineer is primarily concerned with that area of bio-engineering for controlling or modifying natural environment for the economic production and processing and utilization or marketing of plant and animal products. Agricultural engineers integrate the physical, mathematical and engineering sciences with their many applications in agriculture. Careers for graduates are found in the design or manufacturing of farm machinery or in sales and service positions in farm machinery distribution; in soil and water conservation engineering including water resources development; in the electrification, automation and mechanization of farmstead systems; in the development or adaptation of new materials or new designs in farm structures; systems for handling agricultural materials; and in the processing of agricultural products.

**AGRICULTURAL AND EXTENSION EDUCATION.** The agricultural and extension educator has a broad general training in agriculture with basic work in natural sciences, social sciences, humanities and specialized courses in education methods. A variety of educational career opportunities in vocational agriculture, county agricultural extension work, government business, industry, college and other related fields are available.

**HORTICULTURAL EDUCATION.** This curriculum is designed to develop a basic understanding of the art and the science of horticulture and to meet the requirements for teacher certification in Maryland.

#### PRE-PROFESSIONAL PROGRAMS:

**PRE-VETERINARY SCIENCE.** This program is designed for students desiring to prepare for the professional course in veterinary medicine. A combined degree is available to students in pre-veterinary science. A student who has completed 90 academic semester credits at the University of Maryland and who has completed 30 additional academic semester credits at the University of Georgia or at any accredited veterinary school is eligible to make application for the Bachelor of Science degree from the University of Maryland.

**PRE-FORESTRY.** This program is designed for students who may want to pursue two years of basic study in preparation for transfer to a standard forestry curriculum in another institution.

**PRE-THEOLOGICAL.** This program is designed for students who desire some basic background education in agriculture as preparation for the ministry.

A Two-Year Program in Agriculture is offered for students who wish to spend only a limited time beyond high school to prepare for a specialized occupation. Courses are offered at less than the baccalaureate level. Students interested in this program should write to the Institute of Applied Agriculture.

**HONORS PROGRAM.** The College of Agriculture initiated its Honors Program in 1963, in recognition of superior scholarship for excellent students.

#### TYPICAL PROGRAM FOR THE FRESHMEN YEAR

##### *First Semester*

English  
Social Science or Mathematics  
Agriculture  
Botany  
Agriculture elective  
Health  
Physical Education  
ROTC (Optional)

##### *Second Semester*

English  
Mathematics  
Social Science  
Zoology  
Agriculture elective  
Physical Education  
ROTC (Optional)

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

<i>English</i> .....	<i>4 units</i>
<i>Mathematics (College Preparatory)</i> .....	<i>2 units</i>
<i>(Algebra 1 unit and Plane Geometry 1 unit—Agricultural Engineering and Agricultural Chemistry require 2 additional units)</i>	
<i>Biological and Physical Sciences</i> .....	<i>3 units</i>
<i>History and Social Sciences</i> .....	<i>2 units</i>

Two units of foreign language are recommended for students planning to major in Agricultural Engineering, Agricultural Chemistry, Botany and Entomology.

# COLLEGE OF ARTS AND SCIENCES

WITHIN THE COLLEGE OF ARTS AND SCIENCES STUDENTS CAN OBTAIN both a liberal education, in which ideas are cultivated and enjoyed for their own sake, and a more concentrated education, which falls within one or more of the basic disciplines and which points toward a career. The College seeks to develop graduates who can deal intelligently with the problems they will be confronting in the second half of the twentieth century. It tries to provide for its students a general education which will be a continuing source not only of material well-being but of genuine personal satisfaction.

The areas of concentration available within the College lead to the degrees of Bachelor of Arts and of Bachelor of Science.

## BACHELOR OF ARTS

AREAS OF CONCENTRATION LEADING TO THE DEGREE OF BACHELOR OF Arts are in the arts, the humanities, and the social sciences.

Concentration in these areas is the normal preparation for the student who plans to go to law school; to a post-graduate or professional school of business administration, library science, or social service; or to a theological seminary.

The student interested in research (university, government, business and industry) or in college teaching in these areas of concentration will find here the undergraduate preparation necessary for the graduate work required by these careers.

By including the appropriate courses in education, a student in some of these areas can qualify for public school teaching. For students interested in foreign service, the foreign area programs combine intensive study of a language with study of the civilization of the area. Other careers in government and business are open to the student in the College of Arts and Sciences who selects appropriate areas of specialization.

Specialized programs are also offered in the fine arts (art, drama, music) and in speech therapy.

### FOUR YEAR BACHELOR OF ARTS DEGREE PROGRAMS

*American Studies*

*Art<sup>3</sup>*

*Comparative Literature*

*Economics<sup>4</sup>*

*English*

*Foreign Area Studies (French,*

*German, Latin American,*

*Russian, Spanish)*

*French*

*Geography<sup>4</sup>*

---

<sup>3</sup>Also available are a degree in Art Education offered by the College of Education, and a program in Practical Art offered by the College of Home Economics.

<sup>4</sup>Programs in these fields are also offered in the college of Business and Public Administration.

*German*  
*Government and Politics*<sup>1</sup>

*Greek*

*History*

*Latin*

*Music* (see also *Bachelor of*

*Music degree*)

*Philosophy*

*Psychology*

*Russian*

*Sociology and Anthropology*

(including also a program in

*Crime Control*)

*Spanish*

*Speech* (including also programs in

*Dramatic Art and in Speech*

*Therapy*)

**PRE-LAW.** A three-year program, followed by three years of Law at the University of Maryland Law School, leads to the B.A. and LL.B. degrees. Pre-law students may also follow any of the four-year programs and earn the Bachelor of Arts degree before entering law school.

**BACHELOR OF MUSIC.** Four-year program leading to the Bachelor of Music degree. Professional training in theory-composition, history-literature, and applied music (voice or instrument).

#### TYPICAL PROGRAM FOR THE FRESHMAN YEAR

Typical program for the freshman year for students following a program leading to the Bachelor of Arts degree:

##### FIRST SEMESTER

*English*

*Science or Mathematics*

*Foreign Language*

*Fine Arts or Philosophy*

*Physical Activities*

*Science & Theory of Health*

##### SECOND SEMESTER

*Public Speaking*

*Science or Mathematics*

*Foreign Language*

*Social Science*

*Elective*

*Physical Activities*

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

*English* ..... 4 units

*Mathematics* ..... 3 or 4 units of College  
*Preparatory Mathematics*

*Biological and Physical Sciences* ..... 1 or more units

*History and Social Sciences* ..... 1 or more units

*Foreign Languages and Latin* ..... 2 or more units

#### BACHELOR OF SCIENCE

**AREAS OF CONCENTRATION LEADING TO THE DEGREE OF BACHELOR** of Science are in the physical sciences, in the biological sciences, and in mathematics.

Concentration in these areas prepares the student for specialized positions in industry and government. He can also gain the preparation necessary for admission to the professional schools of medicine and dentistry or for admission to graduate work leading to advanced degrees in

Mathematics, Chemistry, Physics, and the Biological Sciences. Research (industry, government, university) and college teaching are among the possibilities open to the student who successfully completes an undergraduate and graduate program in mathematics or one of the basic sciences.

#### FOUR YEAR BACHELOR OF SCIENCE DEGREE PROGRAMS

<i>Astronomy</i>	<i>Physics</i>
<i>Botany<sup>a</sup></i>	<i>Psychology</i>
<i>Chemistry</i>	<i>Zoology</i>
<i>Mathematics</i>	<i>General Biological Sciences</i>
<i>Microbiology</i>	<i>General Physical Sciences</i>

PRE-MEDICAL AND PRE-DENTAL PROGRAMS. There are three-year programs meeting minimum requirements for medical school or dental school. A four-year program in any of the major fields in the College of Arts and Sciences leading to a B. A. or B. S. degree can prepare a student for professional schools. Only exceptionally mature students with consistently high academic records should consider the three-year pre-medical curriculum.

#### TYPICAL PROGRAM FOR THE FRESHMAN YEAR

##### FIRST SEMESTER

*Public Speaking*  
*Mathematics*  
*Science (one or more of the  
 introductory courses)*  
*Social Science*  
*Science & Theory of Health*  
*Physical Activities*

##### SECOND SEMESTER

*English*  
*Mathematics*  
*Science (continued)*  
*American Government*  
*Public Speaking*  
*Elective*  
*Physical Activities*

For the pre-medical and pre-dental student . . .

##### FIRST SEMESTER

*Philosophy or Public Speaking*  
*Mathematics*  
*Chemistry*  
*Zoology*  
*Science & Theory of Health*  
*Physical Activities*

##### SECOND SEMESTER

*English*  
*Mathematics*  
*Chemistry*  
*Zoology*  
*Physical Activities*

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

<i>English</i> . . . . .	4 units
<i>Mathematics</i> . . . . .	4 units of College Preparatory Mathematics
<i>Biological and Physical Sciences</i> . . . . .	1 or more units, including Chemistry and Physics, if possible
<i>History and Social Sciences</i> . . . . .	1 or more units
<i>Foreign Languages and Latin</i> . . . . .	2 or more units

<sup>a</sup>A curriculum in Botany is also offered in the College of Agriculture.

# COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

FOUR-YEAR PROGRAMS LEADING TO THE BACHELOR OF SCIENCE DEGREE are offered by the College of Business and Public Administration. Students may complete the four-year program in a shorter period of time by attending summer sessions. They may choose their programs of study from the offerings of the following departments: Department of Business Administration, Department of Economics, Department of Geography, Department of Government and Politics, Department of Information Systems Management and Department of Journalism.

Students expecting to enroll in the College of Business and Public Administration at the University of Maryland should pursue the pre-college program in high school. Those who follow the commercial studies curriculum in high school are usually not prepared to meet the requirements of the College. The College recommends the following preparation in high school:

## RECOMMENDED PREPARATION IN HIGH SCHOOL

<i>English</i> .....	4 units.
<i>Mathematics</i> .....	3 or more units of College Preparatory Mathematics; including a minimum of 2 units of Algebra and 1 of Geometry.
<i>History and Social Sciences</i> .....	1 or more units.
<i>Natural Science</i> .....	2 or more units.
<i>Foreign Languages</i> .....	2 or more units.

## DEPARTMENTAL PROGRAMS OF STUDY

Before concentrating in any of the College's special fields of study, all students follow during their first two years an educational program that provides a foundation upon which to base advanced work in the management or social sciences or in journalism. The first two years constitute, therefore, a major part of the general education that the University offers and an opportunity to learn something of the nature of different professional and scholarly fields.

With the exceptions noted below, all departments within the College require the following as a part of the freshman-sophomore program of study:

<i>English</i> .....	9 semester hours
<i>Mathematics</i> .....	6
<i>History</i> .....	6
<i>Social Science</i> .....	6
<i>Natural Science</i> .....	7-8
<i>Fine arts and philosophy</i> .....	3
<i>Economics</i> .....	6

By way of exception, the Departments of Geography and Journalism require a minimum of three hours of mathematics. Majors in Government and Politics and in the general program in Geography are required to have at least 12 hours of a foreign language.

Students must also meet University requirements in health and physical activities.

**BUSINESS ADMINISTRATION.** Programs: General Program in Business Administration; Accounting; Finance; Marketing; Personnel & Industrial Relations; Production Management; Statistics; Transportation.

Upon completion of requirements for the degree, students following any of these programs will have had the advantage of a broad general education, a firm understanding of the internal characteristics and external relationships of business, and a professional training focused upon one of the major lines of managerial activity.

All students in business administration follow the same course of study for the first two years. In addition to the general requirements cited above, students take courses in speech, business enterprise, and accounting during the freshman-sophomore years. The junior-senior years are devoted to the requirements of the major plus such complementary courses as are deemed desirable for the completion of a sound general education.

Students who major in one of the areas of business administration often enter business or government immediately after graduation, but their undergraduate programs also prepare them for graduate study in business.

**ECONOMICS.** Students wishing to major in economics and to earn the degree of Bachelor of Science may register in the College of Business and Public Administration, the College of which the Department of Economics is administratively a part. (Under a slightly different set of requirements, students may major in economics in the College of Arts and Sciences.) The first two years are devoted to the general requirements plus an additional course in economics and electives. The junior-senior years are devoted to the requirements of the major, and to elective courses. An honors program in economics is available to students who demonstrate the capacity for outstanding achievement.

Students majoring in economics may look forward to careers in business and government and, after graduate study, to college teaching and to research in many different types of organization.

**GEOGRAPHY.** Programs: General Program in Geography; Cartography; and Urban Geography.

Three programs of study are offered by the Department of Geography to students in the College of Business and Public Administration. The same programs are available—under a slightly different set of requirements—in the College of Arts and Sciences.

All majors in geography devote the first two years to the general requirements and to certain courses in geography. Majors may follow a general program or may concentrate in the area of urban geography or cartography. All geography majors are required to complete 8 hours of science, and general geography majors must complete 12 hours of foreign language. Graduates usually enter teaching, industry, and agencies of state, local or national government.

**GOVERNMENT AND POLITICS.** Programs: General Program in Government and Politics; International Affairs; and Public Administration.

Three programs of study are offered by the Department of Government and Politics to students in the College of Business and Public Administration: (1) a general program in government and politics, (2) a program in international affairs, and (3) a program in public administration. (Under a slightly different set of requirements the general program and the international affairs program are offered also to students in the College of Arts and Sciences. The public administration program is available only in the College of Business and Public Administration.) In all three programs, the first two years are devoted to the general requirements, along with additional courses in government and politics and elective courses. All students are required to complete at least 12 hours of a foreign language. Majors may concentrate in the general program, in international affairs, or in public administration. The junior-senior years are devoted to the advanced government and politics courses and to courses considered complementary to a particular program. Graduates enter upon careers in national, state and local and international organizations and, especially after graduate studies, in teaching.

**INFORMATION SYSTEMS MANAGEMENT.** This department offers a program conceived to meet the needs of the rapidly expanding area of information technology as related to business management and to the areas of social science offered as a part of the College curriculum. In addition to the general requirements previously outlined, the program requires a second year of college mathematics. Supporting courses in accounting and in statistics are required. Courses in integrated data processing and in other aspects of computer utilization are features of the program.

Industry and government offer an increasing number and variety of opportunities to graduates of college programs in this new field.

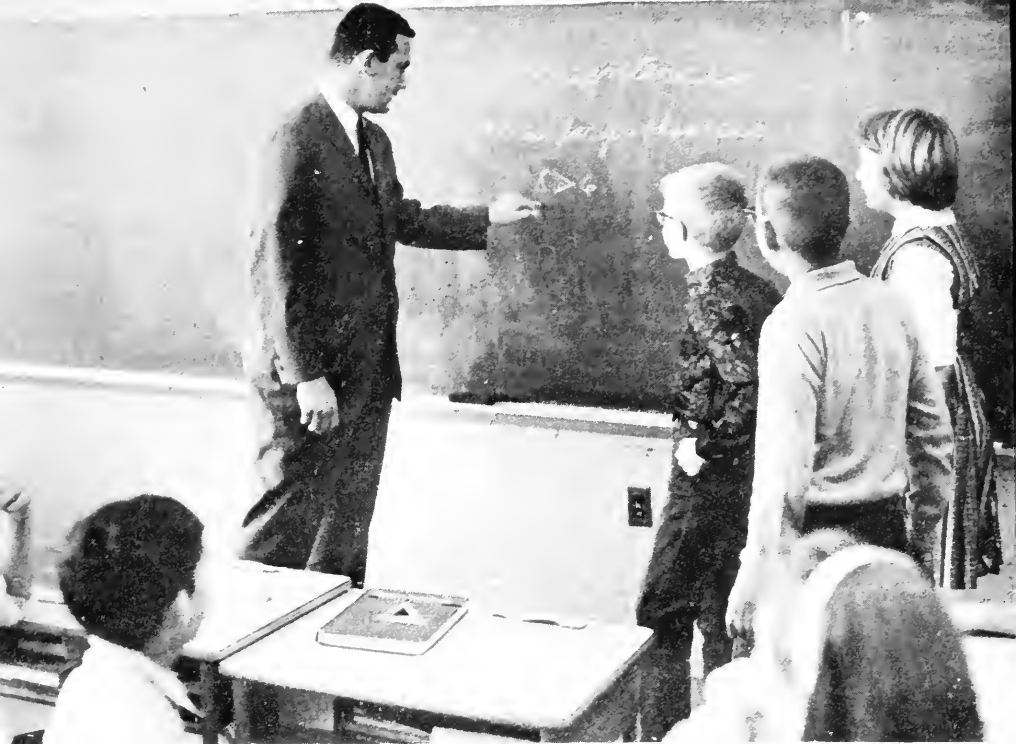
**JOURNALISM.** Students aspiring to become reporters, commentators, editors and publishers may follow the program in journalism. Opportunity is also provided to prepare for careers in the advertising aspects of journalism, as well as in photo-journalism, public relations, and radio-television.

Students pursuing a major in this department devote the first two years to meeting the general requirements, along with 3 hours of journalism and certain electives. The junior-senior years are devoted to advanced journalism courses and to courses complementary to this area of study.

**THE PRE-LAW PROGRAM.** Students majoring in general business may, upon completion of 90 semester hours, apply for admission to the University of Maryland Law School. Upon completion of one year of law school, they are awarded the B.S. degree. With the completion of two additional years of law, they receive the Bachelor of Laws degree. Apart from the pre-law program, students who complete the four-year program with majors in business administration, economics, or government and politics are eligible to apply for admission to law school.

### *Additional Information*

High school counselors and others desiring more specific information on the programs of the College of Business and Public Administration are invited to direct queries to the Assistant Dean, College of Business and Public Administration, University of Maryland, College Park, Maryland.



## COLLEGE OF EDUCATION

THE COLLEGE OF EDUCATION OFFERS CURRICULUM LEADING TO CAREERS in teaching on all levels and in most specialties of education. This wide diversity of choices provides desirable flexibility and breadth. All curriculums are four-year programs and lead to full certification as a teacher and a Bachelor of Science or Arts degree. The specific curriculums are:

ACADEMIC EDUCATION (SECONDARY SCHOOLS). English, foreign languages, mathematics, social sciences, science, speech.

AGRICULTURAL EDUCATION (SECONDARY SCHOOLS; OFFERED BY THE COLLEGE OF AGRICULTURE)

ART EDUCATION (SECONDARY AND ELEMENTARY SCHOOLS)

BUSINESS EDUCATION (SECONDARY SCHOOLS)

EARLY CHILDHOOD EDUCATION (NURSERY SCHOOL, KINDERGARTEN AND PRIMARY GRADES)

ELEMENTARY EDUCATION (ELEMENTARY SCHOOLS; GRADES 1-6)

HOME ECONOMICS EDUCATION (SECONDARY SCHOOLS; VOCATIONAL OR GENERAL)

INDUSTRIAL EDUCATION (SECONDARY SCHOOLS; INDUSTRIAL ARTS OR VOCATIONAL-INDUSTRIAL EDUCATION)

EDUCATION FOR INDUSTRY (A NON-TEACHING PROGRAM WHICH PREPARES STUDENTS FOR EDUCATIONAL, SUPERVISORY OR MANAGEMENT POSITIONS IN INDUSTRY)

## LIBRARY SCIENCE

MUSIC EDUCATION (ELEMENTARY AND SECONDARY SCHOOLS; VOCAL OR INSTRUMENTAL)

PHYSICAL EDUCATION AND HEALTH EDUCATION, IN COOPERATION WITH COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH (SECONDARY AND ELEMENTARY SCHOOLS)

## SPECIAL EDUCATION<sup>a</sup>

Majors in English, social sciences, language, and art receive the B. A. degree. Majors in mathematics may receive either degree. Majors in all other fields receive the B. S. degree.

## SPECIAL FACILITIES AND PROGRAMS

All departments except Industrial Education are housed in the new Education building, a modern facility planned specifically for teacher education.

The Science Teaching Center maintains an up-to-date collection of science teaching materials and publications. The Institute for Child Study offers leadership to child study groups in Maryland and throughout the United States. The Industrial Education building offers modern shop and laboratory facilities. The Nursery-Kindergarten Laboratory School offers observation and participation experiences to students in the early childhood program as well as to students in other fields. Area public schools are also used extensively. A Bureau of Educational Research and Field Services offers consultant assistance to the schools of the state.

## TYPICAL PROGRAM FOR THE FRESHMAN YEAR

### FIRST SEMESTER

*English*

*Art or Music*

*Mathematics or Science*

*Social Science*

*Physical Education*

*Elective or Language*

*Science & Theory of Health*

### SECOND SEMESTER

*Social Science*

*Science*

*Speech*

*Elective or Language*

*Physical Education*

*Health*

## RECOMMENDED PREPARATION IN HIGH SCHOOL

Four units of English and one unit of social science, natural science, and mathematics are required. For some major fields two units of mathematics are required. Additional units in mathematics, natural science, social sciences, and foreign language are desirable for a program that permits the greatest amount of flexibility in meeting the requirements of various College of Education curricula. Fine arts, trade and vocational subjects are acceptable as electives.

---

<sup>a</sup>Not a four-year program—provides an additional area for certification only.

# COLLEGE OF ENGINEERING

*Glenn L. Martin Institute of Technology*

FOUR-YEAR PROGRAMS LEAD TO THE BACHELOR OF SCIENCE DEGREE IN aerospace, chemical, civil, electrical and mechanical engineering, and in fire protection. Each program integrates these elements: (1) BASIC SCIENCE including mathematics, physics, chemistry; (2) ENGINEERING SCIENCE including mechanics of solids and fluids, engineering materials, thermodynamics, electricity and magnetism; (3) PROFESSIONAL STUDIES in aerospace, chemical, civil, electrical or mechanical engineering; (4) LIBERAL ARTS AND SOCIAL SCIENCES in General Education Program; (5) CERTAIN OTHER REQUIRED SUBJECTS including health and physical activities.

Each program lays a broad base for *continued learning* after college in professional practice, in business or industry, in public service, or in graduate study and research.

The following is representative of work performed by engineering graduates.

THE AEROSPACE ENGINEER deals with problems related to transporting people and things by air and through space. Aerodynamics, thermodynamics, and the mechanics of fluids and solids are among his engineering sciences. He may apply them in some phase of planning or producing airplanes, missiles, or rockets, or devising means to sustain and control their flight.

THE CHEMICAL ENGINEER applies chemistry to development and economic production of industrial chemicals, fuels, modern synthetics and certain alloys. He also applies mechanics, thermodynamics, reaction kinetics and aspects of nuclear science to unit operations and processes which are fundamental in the design and operation of the chemical industries.

THE CIVIL ENGINEER is primarily a planner, a designer, a builder, and a manager of public works and private enterprise. His professional service plays a major role in designing, supervising construction, or managing virtually every large building, bridge, dam, highway, railway, airport, water supply, waste disposal system, city plan, industrial plant, public works project, etc.

THE ELECTRICAL ENGINEER puts mathematics and the physical sciences to practical use in designing systems to generate, transmit, distribute, and use electrical energy; to transmit and receive "intelligence," as for example by telephone, radio, radar, television and computers; and to regulate and control mechanical and industrial processes by electronics and servomechanisms.

THE MECHANICAL ENGINEER figures ways to transmit power economically by heat or by mechanical systems. He applies the mechanics of fluids and solids, thermodynamics, and an understanding of the behavior of engineering materials under different conditions. As a professional engineer he devises processes for industrial production. As an industrial agent he serves as a supervisor, manager, or sales representative.

GRADUATES IN FIRE PROTECTION are concerned with scientific and technical problems of preventing loss of life and property by fire, explosion, and related hazards; and they serve industry, public agencies, and insurance companies professionally.

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

If you wish to become a *professional engineer* you should enroll in an *academic* program in high school. Subjects that are recommended for admission total sixteen units as follows:

SUBJECTS	RECOMMENDED
<i>English</i>	4 units
<i>Mathematics (college preparatory)</i>	4
<i>History and social sciences</i>	2
<i>Physical sciences</i>	2
<i>Foreign language—(German, French or Russian)</i>	2
<i>Other academic subjects</i>	2

#### TYPICAL PROGRAM FOR THE FRESHMAN YEAR

All engineering students enroll in essentially the same subjects during their first year in college as follows:

	SEMESTER	
<i>General Education Courses<sup>1</sup></i>	3	3
<i>Elementary Mathematical Analysis; Calculus</i>	4	4
<i>General Chemistry</i>	4	4
<i>Introductory Engineering Science; Mechanics</i>	4	4
<i>Health</i>		2
<i>Physical Activities</i>	1	1

The numbers are "semester-credits." A student should plan to devote each week, on the average, three hours of *effective work* for each semester-credit on his schedule.

Each student in the College of Engineering will select his major-line department—aerospace, chemical, civil, electrical, or mechanical engineering, or fire protection—before he begins his sophomore year's work. Thereafter he will pursue the approved program of his department which leads to the bachelor's degree.

Advanced engineering students who show promise of creativity and leadership in engineering, in the engineering sciences, and in teaching and research, are encouraged to continue in a program of graduate study leading to master's and doctor's degrees. There is an acute shortage of engineers with earned doctor's degrees. There are challenging opportunities for able men with such top-level preparation. The time to plan and to begin working for these top-level opportunities is while you are in high school. Your parents and your teachers can *help* provide the *opportunity*—after that *your education* is up to you. Plan to make the best of it!

<sup>1</sup>Selected from English composition, Literature, Government & Politics, Sociology, Psychology

# COLLEGE OF HOME ECONOMICS

THE PRIMARY FUNCTION OF HOME ECONOMICS IS TO RELATE THE contributions of the physical, biological, and social sciences and art in the approach to the study of all phases of home and family life as applicable to individual families and to agencies serving families.

The educational program of the College of Home Economics is planned to help students function effectively as individuals, as family members, and as responsible citizens; to prepare men and women for positions for which home economics is a major or minor preparation. Entering freshmen may enroll without specifying a major area; however, a choice must be made by the beginning of the fourth semester.

Graduates of the College are prepared to enter one of three broad areas of employment: educational-community-family life, technical, and commercial consumer service. The various programs of study have certain common courses with possible options and electives to meet needs of students. The major curricula include: general and family life; home economics education and extension; applied design; food, nutrition, institution administration; and textiles and/or clothing.

**GENERAL AND FAMILY LIFE.** This program enables a student to build a broad background as well as a specialized emphasis in the areas related to both professional and personal aspects of Home Economics. Careers in family service agencies and consumer education, in addition to personal, family, and community living, are the foci of students in this program.

**EDUCATION AND EXTENSION.** This program is designed for students who are preparing to teach home and family living or to become home economics extension agents. Both programs include study in all phases of home economics and the allied sciences along with specified professional training.

**FOOD, NUTRITION, INSTITUTION ADMINISTRATION.** Students learn the scientific principles underlying food selection, purchase, preparation, and service for home and institution use. Food and nutrition are applied sciences; therefore, courses in chemistry, physiology, microbiology, psychology, and economics are essential to their understanding. Graduates in this area are employed in consumer education departments of business firms, communication areas, and state or community programs. Opportunities in food service include hospitals, schools and colleges, and commercial institutions.

**HOUSING AND APPLIED DESIGN.** This program permits a choice from four areas of specialization: art in advertising, in housing and interior design, and in costume. A major in this area provides background for employment in advertising and in the designing and merchandising of fashion and home furnishings.

**TEXTILES AND CLOTHING.** These curricula promote understanding of textiles, fashion, and clothing design and construction in relation to technological and social developments influencing consumer choices. Graduates have positions in merchandising, fashion design and promotion, textile testing, and research.



#### FIRST SEMESTER

*English Composition and Literature*  
*American Government*  
*Family Life*  
*Design Fundamentals*  
*Science & Theory of Health*  
*Physical Activities*  
*General Chemistry or other Laboratory Science*

#### SECOND SEMESTER

*Math*  
*Sociology of American Life*  
*Consumer Textiles or Basic Foods*  
*Speech*  
*Physical Activities*  
*General Chemistry, Other Laboratory Science, elective*

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

Four units of English and one unit each of social sciences, natural sciences, and mathematics are required. Additional units in the above areas, especially mathematics, and in home and family living are desirable.



## COLLEGE OF PHYSICAL EDUCATION, RECREATION, AND HEALTH

### FOUR YEAR PROGRAMS LEADING TO THE BACHELOR OF SCIENCE DEGREE:

**PHYSICAL EDUCATION.** The curriculum provides an adequate background in general education and scientific areas closely related to this field. Development of skills in a wide range of motor activities is emphasized. Many vocational opportunities are available in public and private schools, organized camping, youth and adult organizations which offer a program of physical activity.

**DANCE.** With the increasing recognition of the importance and scope of dance in educational programs, the need for teachers adequately trained in dance exceeds the number available. The professional curriculum in dance is constructed to meet the steadily rising demand for personnel qualified to teach dance in college, secondary, elementary schools, in camps, recreational agencies and in preparation for dance therapy.

**RECREATION.** Through area courses in sports, swimming and dance, speech and drama, music, arts and crafts, nature lore and camping, and those courses in the major field itself, program planning, organization and administration, leadership techniques, etc. students are qualified to accept leadership positions in hospitals, industry, churches, public departments, with the armed forces, or with the many public and private agencies.

**HEALTH EDUCATION.** A healthy nation is not primarily the responsibility of physicians and druggists but of the people themselves. This means that people need to know how to live healthfully and to utilize available health facilities—that is they all need health education. Persons qualified to teach health are needed in schools, colleges, community health agencies and hospitals. Students interested in qualifying for supervisory or college-level positions are encouraged to plan on doing graduate work either in school health or public health education.

**PHYSICAL THERAPY.** Physical therapy is one of the professions which has come into prominence as the scope of medical care has expanded. The modern concept of the rehabilitation of acute and chronically disabled persons has created an increasing demand for physical therapy service. It offers careers for both men and women who are interested in becoming members of a service which assists the ill and handicapped achieve maximum restoration of physical function.

The University of Maryland offers a course of physical therapy leading to the Bachelor of Science degree and to a certificate to proficiency in physical therapy.

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

In addition to the four units of English and one unit each of Social and Natural Sciences, it is especially desirable for students to have at least one unit each in Biological and Physical Science and three years of college preparatory mathematics. Any experience in music, drama, camping, playground and recreational activities, and group leadership also will be helpful. In addition, participation in school programs of health and safety education and in physical education and athletics are desirable.

#### SPECIAL FACILITIES

The facilities on the campus include five gymnasias, two swimming pools, a physical fitness research laboratory, tennis courts, sports fields, golf driving range and golf course, dance studio, and an excellent library. The Washington YMCA camp, Camp Letts, also is used for certain activities.

Students also are encouraged to use the excellent facilities of the Library of Congress, National Archives and the National Institutes of Health library facilities.

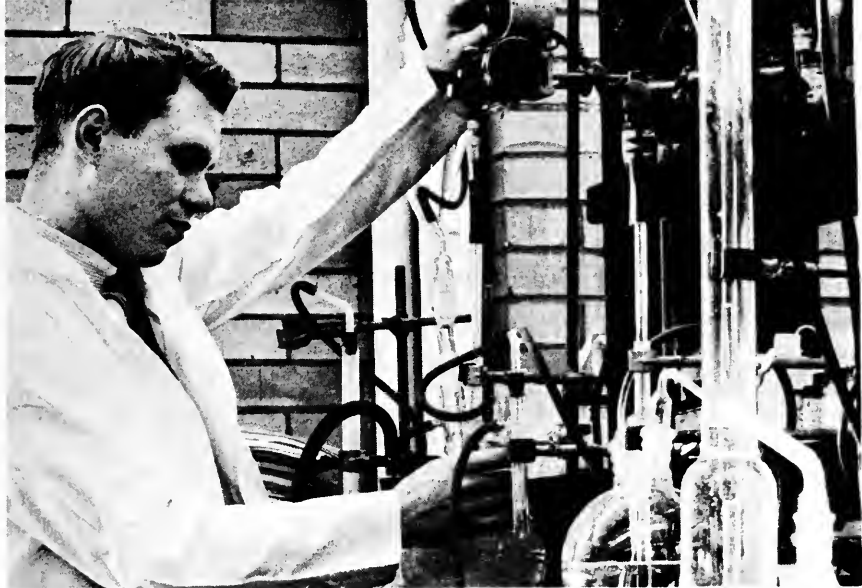
#### EXPERIENCES

In addition to classroom and laboratory work, opportunities for teaching on and off campus and participating in field experience are provided. Membership in professional groups such as Phi Alpha Epsilon, Aqualiners, Dance Club and Gymkana troupe is encouraged as well as participation in other campus activities. In each of the fields of specialization in this College unique opportunities in dance, sports, recreation, musical and dramatics organizations exist in the environs of Washington and Baltimore.

#### TYPICAL PROGRAM FOR THE FRESHMAN YEAR

**FIRST SEMESTER.** English; Social Science; Speech; Introduction to Physical Education, Recreation and Health; Rhythmic Analysis and Movement; Sport Skills and Gymnastics; Basic Body Controls (Women); R.O.T.C. (Men—optional).

**SECOND SEMESTER.** Zoology; Mathematics, Social Science; Modern Dance Techniques (Women); Skills in Square and Social Dance; Sport Skills and Gymnastics; R.O.T.C. (Men—optional).



## THE SCHOOL OF PHARMACY

THE PROFESSION OF PHARMACY MERITS AND INVITES THE SERIOUS CONSIDERATION of meticulous and careful individuals who wish to pursue a career of dedicated service.

The educational program of the School of Pharmacy is designed to train young women and men for the efficient, ethical practice of pharmacy; to instruct students in cultural and scientific subjects as well as in administrative and managerial methods for the orderly development of members of a profession and citizens in a democracy; to guide students into productive scholarship and research for the increase of knowledge and techniques in the healing arts of pharmacy.

The five-year curriculum at the University of Maryland leading to the degree of Bachelor of Science in Pharmacy consists of two years of pre-professional training available at College Park and three years of the pharmacy program offered in Baltimore. Students from other accredited universities or colleges offering appropriate courses may be admitted directly to the professional program at Baltimore, if admissions requirements are met.

Strong encouragement is given to superior students to continue their education beyond the bachelor degree so that they may prepare for teaching and/or research positions.

Scholarships for students enrolled in the pre-professional program at College Park are described in the section "Endowed Scholarships and Grants."

The School of Pharmacy, a member of the American Association of Colleges of Pharmacy, is accredited by the American Council on Pharmaceutical Education.

The prime opportunities available to pharmacists are in the fields of community and hospital pharmacy.

The practice of community pharmacy requires the skills and knowledge of the professional man and the operational activities of the business man in preparing and servicing the medicaments and other health supplies of the community.

The hospital pharmacist utilizes his training in procuring, preparing, distributing and controlling the drug supplies and adjunct materials of his institution.

Pharmaceutical manufacturers employ pharmacists as analysts of raw materials and finished products, as supervisors in the manufacturing plants and as medical sales representatives.

Opportunities are also available to pharmacy graduates in various local and federal agencies.

An academic program in high school is prerequisite to enrollment in the Pharmacy School. Academic subjects which are recommended and required for admission to the Pre-Professional Program at College Park are:

<i>Subject</i>	<i>Recommended</i>	<i>Required</i>
English .....	4 units	4 units
College Preparatory Mathematics—including algebra (1), plane geometry (1) and additional units in advanced algebra, solid geometry, trigonometry, or advanced mathematics .....	4	2
Physical Sciences (Chemistry and Physics) ..	2	1
History and Social Sciences .....	2	1
Biological Sciences .....	1	0
Foreign Language—German or French ....	2	0
Unspecified academic subjects .....	1	8
<b>Total .....</b>	<b>16</b>	<b>16</b>

#### FRESHMAN PROGRAM AT COLLEGE PARK

All students enroll for the following pre-professional courses during their first year in college:

<i>Courses</i>	<i>I</i>	<i>Semester II</i>
General Chemistry .....	4	4
English Composition .....	3	..
Introduction to Mathematics .....	3	3
or		or
Introductory and Elementary Mathematical Analysis .....	3	4
General Zoology .....	4	..
General Botany .....	..	4
Elective (Social Science) <sup>*</sup> .....	..	3
Physical Education .....	1	1
Health .....	2	..
<b>Total .....</b>	<b>17 or 18</b>	<b>15, 16, 17 or 18</b>

<sup>\*</sup> SOCIAL SCIENCE ELECTIVES

G. and P. 1, American Government  
Psychology 1, Introduction  
to Psychology

Sociology 1, Introduction  
to Sociology  
Anthropology 2, Introduction  
to Anthropology



## THE SCHOOL OF NURSING

THE SCHOOL OF NURSING OFFERS BOTH GENERAL AND FUNDAMENTAL education for students who wish to prepare for professional nursing: (A) A generic four-year college program planned for students who have no previous experience or knowledge in nursing; and (B) A program for registered nurses who have completed a three-year nursing program and who desire to bring up to full collegiate level their basic nursing preparation. Both programs lead to the degree of Bachelor of Science in Nursing.

Beginning students in nursing spend the first two academic years on the College Park Campus or Baltimore County Campus. Students from other accredited colleges may be admitted directly to the Baltimore Campus providing they meet admission requirements. Students in the registered graduate nurse program attend classes selected by the advisor on either campus.

In association with the Graduate School of the University, the School of Nursing prepares professional nurses who hold Bachelor of Science Degrees in Nursing with a "B" or better average as administrators in nursing and as instructors, supervisors, and clinical specialists in medical-surgical nursing, obstetrical nursing, pediatric nursing, general psychiatric nursing, public health nursing and nursing of children with psychiatric disorders. Masters students take most of their work on the Baltimore Campus.

All programs presently being offered by the School of Nursing are accredited by the National League for Nursing.

The facilities for instruction used by the School of Nursing include the various colleges and professional schools of the University and the University Hospital. Other facilities include the Baltimore City Health Department, Maryland State Health Department, the State Department of Mental Hygiene, Montebello State Hospital, Baltimore City Hospitals, and The Children's Guild. Other accredited hospitals are utilized for resident training in Administration in Nursing and Practice Teaching.

#### TYPICAL PROGRAM FOR THE FRESHMAN YEAR

##### FIRST SEMESTER

*English*  
*Sociology*  
*Zoology*  
*Chemistry*  
*Speech*  
*Physical Activities*

##### SECOND SEMESTER

*English*  
*Government and Politics*  
*Chemistry*  
*Speech*  
*Nursing*  
*Physical Activities*  
*Algebra*

#### RECOMMENDED PREPARATION IN HIGH SCHOOL

*English* ..... 4 years  
*Mathematics* ..... 2 years  
*History and Social Sciences* ..... 2 years  
*Foreign Language* ..... 2 years or more  
*Science* ..... 2 years (including 1 unit of Physics,  
and 1 unit of Biology or Chemistry)

#### *Walter Reed Army Medical Center and Other Related Approved Military Facilities*

Through a contractual arrangement between the University of Maryland School of Nursing and the Office of The Surgeon General, United States Army, the facilities of the School of Nursing, University of Maryland have been extended to include the Walter Reed Army Medical Center and other military bases and welfare agencies. These clinical facilities will be utilized by the Faculty of the School of Nursing, University of Maryland, to provide learning experiences for those students who have been subsidized through the United States Army and who plan to remain in the military service following graduation.

Students who have two years of lower division work in regionally accredited four year colleges or universities may transfer to the University of Maryland School of Nursing provided they meet the standards of the University of Maryland. All major professional or upper division learning experiences in the major of nursing, will be under the direction of the Dean, Clinical-specialists Department Heads, and Faculty of the University of Maryland School of Nursing.

For further information write to:

The Dean, School of Nursing  
University of Maryland  
624 W. Lombard Street  
Baltimore, Maryland 21201

# UNIVERSITY COLLEGE

**B**ASED ON THE PHILOSOPHY THAT CONTINUING EDUCATION IS ESSENTIAL to meet the demands of today's complex society, in contrast to the usual practice of bringing the student to the University, University College makes educational opportunities available for adult students at hours and locations suitable to their needs.

Specifically, the College has a three-fold purpose: (1) To extend the facilities of the University by offering college credit evening courses for adults on campus and off campus throughout the State, the District of Columbia and various overseas centers; (2) To offer the Bachelor of Arts degree in General Studies for qualified adult students; and (3) To arrange special programs to meet the specific educational needs of adult groups. The recently completed Center of Adult Education, embodying specially designed facilities, provides a climate for adult learning in a residential setting.

The overseas programs are offered in cooperation with the U. S. Armed Forces to military and civilian personnel and their dependents stationed in twenty-five foreign countries on four continents. The College does not offer correspondence courses.

Undergraduate courses are offered in the arts and sciences, business administration and education. Graduate courses in government and politics are offered at the Pentagon Center, and graduate courses in education are offered in the evening on the Baltimore Campus and at Maryland State College, Princess Anne, Maryland.

The General Studies curriculum provides opportunities for programs in the humanities, social sciences and business, with concentrations of study in such fields as commerce, English, government and politics, history, philosophy, psychology, and sociology.

Students who have never attended a college or university must have either an acceptable high school diploma or the high school equivalent. Students who have attended another college or university must be in good academic standing in order to enroll in University College. For further information about admission requirements, see the University College catalog or a College advisor. Graduate courses are open only to students who are fully matriculated in the Graduate School prior to the date of registration.

Continuing educational programs are offered each year at the following centers in the State of Maryland and the District of Columbia:

Aberdeen Proving Ground  
Andrews Air Force Base  
Baltimore Campuses  
Bolling Air Force Base  
College Park Campus  
D.C. Recreation Dept.  
Edgewood Arsenal

Fort Meade  
Fort Ritchie  
Maryland Penitentiary  
Montgomery County Police  
National Bureau of Standards  
Naval Ordnance Laboratory  
Naval Research Laboratory

Patuxent River Naval Air Station  
Pentagon  
Prince Georges County Police  
Tolchester Missile Site  
Walter Reed Army  
Medical Center

In addition, during the 1965-66 school year, courses offered primarily for teachers in service were given in the following counties throughout the State:

Allegany  
Anne Arundel  
Baltimore  
Calvert  
Caroline

Charles  
Dorchester  
Frederick  
Harford  
Kent

Montgomery  
Prince George's  
Queen Anne's  
Somerset  
St. Mary's

Talbot  
Washington  
Wicomico  
Worcester

For further information, see the University College catalog which may be obtained by writing the Dean, University College, University of Maryland, College Park, Maryland 20740.



## APPENDIX A

### FEES AND EXPENSES

#### GENERAL

All checks or money orders should be made payable to the University of Maryland for the exact amount of the charges. In cases where students have been awarded General Assembly Grants or University Grants, the amount of such grants will be deducted from the bill.

All fees are due and payable at the time of registration, and students should come prepared to pay the full amount of the charges. No student will be admitted to classes until such payment has been made.

The University reserves the right to make such changes in fees and other charges as may be found necessary, although every effort will be made to keep the cost to the student as low as possible.

No degree will be conferred, nor any diploma, certificate, or transcript of record issued to a student who has not made satisfactory settlement of his account.

#### EXPLANATION OF FEES

The application fee for the undergraduate colleges and the summer session partially defrays the cost of processing applications for admission to these divisions of the University. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee. Applicants who have enrolled with the University of Maryland in its Evening Division at College Park or Baltimore, or at one of its off-campus centers are not required to pay the fee since they have already paid a matriculation fee.

The Fixed Charges Fee is not a charge for tuition. It is a charge to help defray the cost of operating the University's physical plant, to pay administrative and clerical expenses and other costs which ordinarily would not be included as a cost of teaching personnel and teaching supplies.

The Instructional Materials Fee represents the average of laboratory fees assigned to full-time undergraduate students. Graduate students, part-time undergraduate students and students enrolled in the Summer School will be billed for individual laboratory fees, and not the Instructional Materials Fee. Full-time undergraduate students subject to the fees set forth below will be billed the appropriate fee and also will be billed the Instructional Materials Fee: Math. 1, \$45; Applied Music, \$40; and P. E. 8 Riding Class, \$26.

The Athletic Fee is charged for the support of the Department of Intercollegiate Athletics. All students are eligible and all students are encouraged to participate in all of the activities of this department and to attend all contests in which they do not participate.

The Student Activities Fee is a mandatory fee included at the request of the Student Government Association. It covers class dues and is used in sponsoring various student activities, student publications and cultural programs.

The Special Fee is used to pay interest on and amortize the cost of construction of the Student Union Building, the Activities Building, and the Swimming Pool.

The Recreational Facilities Fee is paid into a fund which will be used to expand the recreational facilities on the College Park campus, especially the Student Union Building.

Full-time undergraduate students who register for the second semester but who were not full-time undergraduate students in the first semester are required to pay the following additional fees: Athletic Fee, \$10.00; Student Activities, \$8.00; Special Fee, \$7.50; Recreational Facilities Fee, \$12.50.

## DEFINITION OF RESIDENCE AND NON-RESIDENCE

Effective immediately is the following definition of "resident" and "non-resident":

Students who are minors are considered to be resident students if at the time of their registration their parents have been domiciled in the State of Maryland for at least six months.

The status of the residence of a student is determined at the time of his first registration in the University and may not thereafter be changed by him unless, in the case of a minor, his parents move to and become legal residents of Maryland by maintaining such residence for at least six months. However, the right of the minor student to change from a non-resident status to resident status must be established by him prior to the registration period set for any semester.

Adult students are considered to be residents if at the time of their registration they have been domiciled in Maryland for at least six months provided such residence has not been acquired while attending any school or college in Maryland or elsewhere. *Time spent on active duty in the armed services while stationed in Maryland will not be considered as satisfying the six months period referred to above except in those cases in which the adult was domiciled in Maryland for at least six months prior to his entrance into the armed service and was not enrolled in any school during that period.*

The word "domicile" as used in this regulation shall mean the permanent place of abode. For the purpose of this rule only one domicile may be maintained.

## FEES FOR RESIDENTS AND NON-RESIDENTS

### FEES FOR UNDERGRADUATE STUDENTS:

	<i>First Semester</i>	<i>Second Semester</i>	<i>Total</i>
<b>MARYLAND RESIDENTS</b>			
Fixed Charges .....	\$140.00	\$130.00	\$270.00
Instructional Materials .....	12.00	12.00	24.00
Athletic Fee .....	20.00	....	20.00
Student Activities Fee .....	12.00	....	12.00
Special Fee .....	15.00	....	15.00
Recreational Facilities Fee .....	25.00	....	25.00
	<u>\$224.00</u>	<u>\$142.00</u>	<u>\$366.00</u>
<b>RESIDENTS OF THE DISTRICT OF COLUMBIA, OTHER STATES AND COUNTRIES</b>			
Tuition Fee for Non-Resident Students ....	\$200.00	\$200.00	\$400.00
Total Fee for Non-Resident Students.....	<u>\$424.00</u>	<u>\$342.00</u>	<u>\$766.00</u>
<b>BOARD AND LODGING</b>			
Board .....	\$220.00	\$220.00	\$440.00
Dormitory Room			
Maryland Residents .....	\$160.00	\$160.00	\$320.00
Other States and Countries .....	\$210.00	\$210.00	\$420.00

The above fees do not apply to the temporary Veteran's Housing Units. The rates for these family units are as follows: two-room apartment \$42.50 per month, three-room apartment \$45.50 per month.

## SPECIAL FEES

## UNDERGRADUATE APPLICATIONS

The deadline for the receipt of applications for the Spring Semester is January 1.

All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before June 1. Any student registering for nine (9) or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between June 1 and July 15. Applicants for full-time attendance filing after June 1 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's education records (except current summer school grades) ACT scores (in the case of new freshmen) and medical examination report must be received by July 15.

Application Fee (see "Explanation of Fees," page 56)	\$ 10.00
Late Application Fee	25.00
Matriculation Fee	10.00
Graduation Fee for Bachelor's degree*	10.00
Room Deposit Fee payable upon application for dormitory room (To be deducted from the first semester room charges at registration.)	50.00
Vehicle Registration Fee, each vehicle (Payable each academic year by all students registered for courses on the College Park campus and who drive on the campus.)	5.00
Practice Teaching Fee	24.00
Special Fee for students requiring additional preparation in Mathematics, per semester (Required of students whose curriculum calls for Math. 10 or 18 and who fail in qualifying examination for these courses.)	45.00
Special Guidance Fee per semester (for students who are required or who wish to take advantage of the effective study course, and/or the tutoring service offered by the Office of Intermediate Registration)	15.00
Fees for Auditors are exactly the same as fees charged to students registered for credit with the exception that the non-resident fee will not be charged in the case of students not registering for credit in any courses.	
Special students are assessed fees in accordance with the schedule for the comparable undergraduate or graduate classification.	

## LABORATORY AND OTHER FEES

Paid by all students except full-time undergraduate students who are assessed the Instructional Materials Fee

### LABORATORY FEES PER SEMESTER COURSE:

#### AGRICULTURE

Agricultural and Extension Education	\$35.00
Agricultural Engineering	3.00
Animal Science	3.00
Botany	5.00-6.00-10.00
Entomology	3.00
Horticulture	5.00

#### ARTS AND SCIENCES

Art	15.00-20.00
Astronomy	3.00-10.00
Chemistry	12.00-20.00
Computer Science	10.00-15.00
Microbiology	15.00-20.00
Music	5.00-40.00
Physics (Lectures and demonstrations)	2.00- 3.00
Introductory	3.00
All other	10.00

Psychology	4.00-5.00-6.00
Speech (Depending on laboratory)	1.00-2.00-3.00-5.00-10.00
Radio and Stagecraft	2.00
Zoology	12.00
BUSINESS ADMINISTRATION	7.50-10.00
Journalism	3.00- 6.00
Office Management and Techniques	7.50-10.00
Statistics	10.00
EDUCATION (Depending on Laboratory)	1.00-2.00-5.00-24.00
Industrial Education	5.00- 7.50
ENGINEERING	
Chemical Engineering	8.00-10.00
Electrical Engineering	5.00-10.00
Mechanical Engineering	3.00- 6.00
HOME ECONOMICS (Depending on Course)	1.00-3.00-10.00

### MISCELLANEOUS FEES AND CHARGES

#### Part-time Undergraduate Students:

Fee per credit hour	18.00
Auxiliary Facilities fee per semester payable at each registration	3.00
Vehicle Reg. Fee	5.00
(The term "part-time students" is interpreted to mean undergraduate students taking 8 semester credit hours or less. Students carrying 9 semester hours are considered to be full time and must pay the regular full-time fees.)	

\*An additional late application fee of \$10.00 will be assessed against students who fail to apply for graduation within the first eight weeks of a regular semester or the first three weeks of a summer session. Students who apply after the end of the twelfth week of a regular academic semester and those who apply after the end of the fourth week of a summer session will be required to wait for the next academic semester in order to obtain a diploma.

<b>Late Registration Fee</b> .....	<b>20.00</b>
(All students are expected to complete their registration, including the filing of class cards and payment of bills, on the regular registration days. Those who do not complete their registration during the prescribed days must pay this fee.)	
Fee for change in registration .....	5.00
Fee for failure to report for medical examination appointment .....	2.00
Special Examination Fee—to establish college credit—per semester hour .....	5.00
Transcript of Record Fee (one transcript furnished without charge) .....	1.00

Property Damage Charge: Students will be charged for damage to property or equipment. Where responsibility for the damage can be fixed, the individual student will be billed for it; where responsibility cannot be fixed, the cost of repairing the damage or replacing equipment will be prorated.

#### Library Charges:

Fine for failure to return book from General Library before expiration of loan period .....	per day \$ .05
Fine for failure to return book from Reserve Shelf before expiration of loan period:	
First hour overdue .....	.25
Each additional hour overdue .....	.05

In case of loss or mutilation of a book, satisfactory restitution must be made.

In the event it becomes necessary to transfer uncollected charges to the Cashier's office, an additional charge of \$1.00 is made.

#### TEXTBOOKS AND SUPPLIES

Textbooks and classroom supplies: These costs vary with the course pursued, but will average per semester .....	50.00
---	-------

#### FEES FOR GRADUATE STUDENTS

Fee per semester hour .....	24.00
Application Fee, payable at time of first application for admission to the Graduate School .....	10.00
Graduation Fee Master's Degree <sup>10</sup> .....	10.00
Graduation Fee for Doctor's Degree <sup>10</sup> .....	50.00
Infirmity Fee .....	5.00
Vehicle Registration Fee .....	5.00
Foreign Language examination .....	6.00
Testing Fee (Education Majors) .....	5.00

NOTES: Fees in the Graduate School are the same for all students, whether or not they are residents of the State of Maryland.

All fees, except Graduation Fee, are payable at the time of registration for each semester.

Graduation Fee must be paid prior to graduation.

No provision for housing students is made by the University.

Graduate students entering in February pay an Infirmity fee of \$2.50.

#### FEES FOR OFF-CAMPUS COURSES

Matriculation Fee (payable once, at time of first registration by all students—full time and part time, candidates for degrees, and non-candidates).	
For Undergraduates .....	\$ 10.00
For Graduates .....	10.00

Fee for all students—limit 6 hours. For exceptional adult students taking off-campus courses the limit may be increased to 9 hours. Charge per credit hour .....	15.00
--	-------

Laboratory Fees: A laboratory fee, to cover cost of materials used, is charged in laboratory courses. Fees vary with the course and can be ascertained in any case by inquiry to the Dean of University College.

<sup>10</sup>An additional late application fee of \$10.00 will be assessed against students who fail to apply for graduation within the first eight weeks of a regular semester or the first three weeks of a summer session. Students who apply after the end of the twelfth week of a regular academic semester and those who apply after the end of the fourth week of a summer session will be required to wait for the next academic semester in order to obtain a diploma.

## WITHDRAWAL AND REFUND OF FEES

Any student compelled to leave the University at any time during the academic year should file an application for withdrawal, bearing the proper signature, in the Office of the Registrar. If this is not done, the student will not be entitled, as a matter of course, to a certificate of honorable dismissal, and will forfeit his right to any refund to which he would otherwise be entitled. The date used in computing refunds is the date the application for withdrawal is filed in the office of the Registrar.

In the case of a minor, withdrawal will be permitted only with the written consent of the student's parent or guardian.

Students withdrawing from the University will be credited for all academic fees charged to them in accordance with the following schedule:

<i>Period from Date Instruction Begins</i>	<i>Refundable</i>
Two weeks or less .....	80%
Between two and three weeks .....	60%
Between three and four weeks .....	40%
Between four and five weeks .....	20%
Over five weeks .....	0

The Application Fee, Matriculation Fee and Vehicle Registration Fee are not returnable in any instance.

No part of the charges for room and board is refundable except where the student officially withdraws from the University or where he is given permission by the appropriate officials of the University to move from the residence halls and/or to discontinue dining hall privileges. In these cases, the refund will be computed by deducting ten percent of the charge for the semester as a service charge and the remainder will be pro rated on a weekly basis. No room and/or board refunds will be made after the fourteenth week of the semester. ID Cards with dining hall validation issued to boarding students must be surrendered at the Auditor's Office in the Administration Building on the day of withdrawal before any refund will be processed.

In computing refunds to students who have received the benefit of scholarships and loans from University Funds, the computation will be made in such a way as to return the maximum amount to the scholarship and loan accounts without loss to the University.

No refund of the Athletic, Student Activity, Special, Recreational Facilities, Infirmary, and Advisory and Testing Fees is made to students who withdraw at the close of the first semester.

No refunds of Fixed Charges, Lodging, Tuition, Laboratory Fees, Instructional Materials Fee, etc., are allowed when courses are dropped, unless the student withdraws from the University.

When regularly enrolled part time students in off-campus instruction officially drop a course or courses and continue with one or more courses, they may receive a refund of 80% for the dropped courses if they are officially dropped prior to the third meeting of the class or classes.

## TRANSCRIPTS OF RECORDS

Students and alumni may secure transcripts of their scholastic records from the Office of the Registrar. No charge is made for the first copy; for additional copies, there is a charge of \$1.00 for each transcript. Checks should be made payable to the University of Maryland. Transcripts of records should be requested at least one week in advance of the date when the records are actually needed. No transcript of a student's record will be furnished any student or alumnus whose financial obligations to the University have not been satisfied.

## APPENDIX B

### HONORS, AWARDS, SCHOLARSHIPS AND FINANCIAL AIDS

#### HONORS, AWARDS

**SCHOLARSHIP HONORS**—Final honors for excellence in scholarship are awarded to one-fifth of the graduating class in each College. "HIGH HONORS" are awarded to the upper half of this group; "HONORS" to the lower half. To be eligible for honors, a student must complete at least two years of resident work (60 semester hours) at the University with an average of B (3.0) or higher.

**MILTON ABRAMOWITZ MEMORIAL PRIZE IN MATHEMATICS**—A prize is awarded annually to a junior or senior student majoring in mathematics who has demonstrated superior competence and promise for future development in the field of mathematics and its applications.

**THE ALCOA FOUNDATION TRAFFIC AND TRANSPORTATION AWARD** to an outstanding senior student majoring in transportation.

**ALPHA CHI SIGMA AWARD**—The Alpha Rho Chapter of the Alpha Chi Sigma Honorary Fraternity offers annually a year's membership in the American Chemical Society to the senior majoring in Chemistry or Chemical Engineering whose average has been above 3.0 for three and one-half years.

**ALPHA LAMBDA DELTA AWARD**—Presented to the senior member of the group who has maintained the highest average for three and a half years. She must have been in attendance in the institution for the entire time.

**ALPHA LAMBDA DELTA SENIOR CERTIFICATE AWARD**—Senior members of Alpha Lambda Delta, honorary scholastic society for women, who have maintained an average of 3.5, receive this certificate.

**ALPHA ZETA MEDAL**—The Professional Agricultural Fraternity of Alpha Zeta awards annually a medal to the agricultural student in the freshman class who attains the highest average in academic work.

**AMERICAN ASSOCIATION OF UNIVERSITY WOMEN ANNUAL GRADUATE PRIZE.**

**AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS AWARD**—Free memberships in the Institute for one year and cash prizes for the best paper presented at a Student Branch meeting and for the graduating aeronautical senior with the highest academic standing.

**AMERICAN INSTITUTE OF CHEMICAL ENGINEERS AWARD**—A certificate, pin, and magazine subscription are awarded to the junior member of the Student Chapter who attained the highest overall scholastic average during his freshman and sophomore years.

**AMERICAN INSTITUTE OF CHEMISTS AWARD**—Presented for outstanding scholarship in chemistry and for high character.

**AMERICAN SOCIETY OF CIVIL ENGINEERS AWARD**—The Maryland Section of the American Society of Civil Engineers awards annually the first year's dues of an associate membership in the Society to a senior member of the Student Chapter on recommendation of the faculty of the Department of Civil Engineering.

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARD**—Presented to the Senior member who contributed most to the local chapter.

**AMERICAN SOCIETY FOR TESTING MATERIALS**—A student membership prize is awarded to an engineering senior in recognition of superior scholastic ability and demonstrated interest in engineering materials and their evaluation.

**APPLEMAN-NORTON AWARD IN BOTANY**—The Department of Botany offers a scholarship award of \$100 in honor of Emeritus Professors C. O. Appleman and J. B. S. Norton to a senior major in Botany who is considered worthy on the basis of demonstrated ability and excellence in scholarship. The scholarship is awarded by the Committee on scholarships upon the recommendation of a committee of the faculty of the Department of Botany.

**ASSOCIATED WOMEN STUDENTS AWARDS**—Presented for outstanding achievement, character, and service to the University.

**DAVID ARTHUR BERMAN MEMORIAL AWARD**—This award is offered by the family of David Arthur Berman to the highest ranking junior in the Department of Chemical Engineering who is also a member of Tau Beta Pi.

**DINAH BERMAN MEMORIAL MEDAL**—The Dinah Berman Memorial Medal is awarded annually to the sophomore who has attained the highest scholastic average of his class in the College of Engineering. This medal is given by Mr. Benjamin Berman.

**B'NAI B'RITH AWARD**—The B'nai B'rith Women of Prince Georges County present a Book Award for excellence in Hebrew Studies.

**BUSINESS EDUCATION AWARD OF MERIT** to a student in Business Education in recognition of outstanding achievement as a student.

**CITIZENSHIP PRIZE FOR MEN**—President Emeritus H. C. Byrd of the Class of 1908, annually presents this award to the member of the senior class who, during his collegiate career, has most nearly typified the model citizen and who has done most for the general advancement of the interests of the University.

**CITIZENSHIP PRIZE FOR WOMEN**—This prize is presented annually as a memorial to Sally Sterling Boyd, by her children, to that member of the senior class who best exemplifies the enduring qualities of the pioneer woman. These qualities typify self dependence, courtesy, aggressiveness, modesty, capacity to achieve objectives, willingness to sacrifice for others, strength of character, and those other qualities that enabled the pioneer woman to play such a fundamental part in the building of the nation.

**THE CARROLL E. COX GRADUATE SCHOLARSHIP AWARD** in Botany to the outstanding graduate student in the Department of Botany during the last year.

**BERNARD L. CROZIER AWARD**—The Maryland Association of Engineers awards a cash prize of twenty-five dollars to the senior in the College of Engineering who, in the opinion of the faculty, has made the greatest improvement in scholarship during his stay at the University.

**VIRGINIA DARE AWARD**—The Virginia Dare Extract Company awards annually a plaque and \$25.00 to the outstanding student in ice cream manufacturing with an overall good standing in dairy.

**THE DANFORTH FOUNDATION AND THE RALSTON PURINA AWARDS**—The Danforth Foundation and the Ralston Purina Company of St. Louis offer two summer awards to outstanding men students in the College of Agriculture, one for a student who has successfully completed his junior year, the other for a student who has successfully completed his freshman year. The purpose of these awards is to bring together outstanding young men for leadership training.

The Danforth Foundation and the Ralston Purina Company of St. Louis offer two summer awards to outstanding Home Economics women students, one to a junior and one to a freshman. The purpose of these is to bring together outstanding young women for leadership training.

**THE DELMARVA TRAFFIC CLUB AWARD** to a junior student majoring in transportation whose residence is on the Maryland Eastern Shore.

**DELTA DELTA DELTA MEDAL**—This sorority awards a medal annually to the woman who attains the highest average in academic work during the sophomore year.

**DELTA GAMMA SCHOLARSHIP AWARD**—This award is offered to the woman member of the graduating class who has maintained the highest average during three and one-half years at the University.

**DELTA SIGMA PI SCHOLARSHIP KEY**—This award is offered to a member of the graduating class who has maintained the highest scholastic average for the entire four-year course in the College of Business and Public Administration.

**NATHAN L. DRAKE AWARD**—Presented by the Alpha Rho Chapter of Alpha Chi Sigma to the most promising student who is majoring in chemistry and has completed the sophomore year.

**EDUCATION ALUMNI AWARD**—Presented to the outstanding senior man and senior woman in the College of Education.

**ENGLISH DEPARTMENT SHORT FICTION AWARD**—The English Department awards an annual prize of one hundred dollars provided by an anonymous donor, to the undergraduate or graduate student who has written and submitted for the judgment of a faculty committee the best piece of short fiction during the current school year.

**GENERAL ELECTRIC COMPANY** prize to the outstanding first year graduate student in physics and to the outstanding first year graduate student in astronomy.

**GODDARD MEDAL**—The James Douglass Goddard Memorial Medal is awarded annually to the resident of Prince Georges County, born therein, who makes the highest average in his studies and who at the same time embodies the most manly attributes. The medal is given by Mrs. Anne G. Goddard James of Washington, D.C.

**CHARLES B. HALE DRAMATIC AWARDS**—The University Theatre recognizes annually the man and woman members of the senior class who have done most for the advancement of dramatics at the University.

**HAMILTON AWARD**—This award is offered by the Hamilton Watch Company to the graduating senior in the College of Engineering who has most successfully combined proficiency in his major field of study with achievements—either academic, extra-curricular, or both—in the social sciences or humanities.

**THE HASKINS AND SELLS FOUNDATIONS, INC., AWARD** to the senior student in the College of Business and Public Administration concentrating in accounting who has demonstrated excellent ability in this field of study.

**HOME ECONOMICS ALUMNI AWARD**—Presented to the student outstanding in application of home economics in her present living and who shows promise of carrying these into her future home and community.

**INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERING AWARD**—The Washington Section of the Institute of Electrical and Electronics Engineers defrays the expenses of a year's membership as an associate in the Institute for the senior doing the most to promote Student Branch activities.

**JOE ELBERT JAMES MEMORIAL AWARD**—Gold watch annually awarded to the graduating senior in horticulture on basis of scholarship and promise of future achievement.

**LEIDY CHEMICAL COMPANY AWARD** to an outstanding student majoring in chemistry.

**MARYLAND-DELAWARE PRESS ASSOCIATION ANNUAL CITATION**—Presented to the outstanding senior in journalism.

**MARYLAND RECREATION AND PARKS SOCIETY AWARD** to an outstanding senior majoring in recreation.

**MEN'S LEAGUE AWARD** to the male senior who gave the most to sports.

**MEN'S LEAGUE CERTIFICATES**—Offered for outstanding achievement, character, and service to the University.

**MEN'S LEAGUE CUP**—This award is offered by the Men's League to the graduating male senior who has done the most for the male student body.

**MOTOR FLEET SUPERVISORS AWARD** to a student majoring in transportation in the College of Business and Public Administration.

**NATIONAL SOCIETY OF FIRE PROTECTION ENGINEERS AWARDS**—Presented to the most outstanding senior and sophomore in the Fire Protection curriculum.

**NOXZEMA CHEMICAL COMPANY SCHOLARSHIP AWARD** to an undergraduate student in chemistry.

**OMICRON NU SORORITY MEDAL**—This honorary sorority awards a medal annually to the freshman woman in the College of Home Economics who attains the highest scholastic average during the first semester.

**PHI BETA KAPPA JUNIOR AWARD**—An award to be presented to the junior initiate into Phi Beta Kappa who has attained the highest academic average.

**PHI BETA KAPPA—LEON P. SMITH AWARD**—The award of the Gamma of Maryland Chapter of Phi Beta Kappa is presented to the graduating senior with the highest cumulative scholastic average whose basic course program has been in the liberal studies.

**PHI CHI THETA KEY**—The Phi Chi Theta Key is awarded to the outstanding graduating senior woman in the College of Business and Public Administration on the basis of scholarship, activities, and leadership.

**PHI DELTA KAPPA AWARD**—Presented to an outstanding man in the graduating class of the College of Education.

**PHI SIGMA AWARDS** for outstanding achievement in the biological sciences to an undergraduate student and a graduate student.

**PI DELTA EPSILON NATIONAL MEDAL OF MERIT AWARDS**—Offered by the National Council of Pi Delta Epsilon to the outstanding senior woman and the outstanding senior man in Journalism activities.

**PI DELTA EPSILON AWARD** for outstanding service to communications in the field of broadcasting.

**PI DELTA EPSILON AWARD** for outstanding service to communications in the field of Business.

**PI DELTA EPSILON AWARD** to the outstanding freshman in the field of communications.

**PI DELTA EPSILON AWARD** for outstanding service to communications in the field of editorial journalism.

**PI TAU SIGMA AWARD**—An annual handbook award to the most outstanding sophomore in mechanical engineering on the basis of scholastic average and instructors' ratings.

**PILOT FREIGHT CARRIERS, INC., AWARD** to the senior student in the College of Business and Public Administration who has majored in Transportation and who has demonstrated competence in this field of study.

**PUBLIC RELATIONS SOCIETY OF AMERICA**—The Baltimore Chapter of PRSA presents an annual citation to the outstanding senior majoring in public relations.

**SIGMA ALPHA OMICRON AWARD**—This award is presented to a senior student majoring in Microbiology for high scholarship, character and leadership.

**THE SIGMA CHAPTER, PHI DELTA GAMMA AWARD** to an outstanding woman who has completed the requirements for the doctoral degree.

**ALGERNON SYDNEY SULLIVAN AWARD**—The New York Southern Society, in memory of its first president, awards annually medallions and certificates to one man and one woman of the graduating class and one non-student who evince in their daily life a spirit of love for and helpfulness to other men and women.

**TAU BETA PI AWARD**—The Maryland Beta Chapter of Tau Beta Pi Association, national engineering honor society, awards an engineer's handbook to the junior in the College of Engineering who during his sophomore year has made the greatest improvement in scholarship over that of his freshman year.

**WALL STREET JOURNAL STUDENT ACHIEVEMENT AWARD**—Awarded annually to the graduating senior who has maintained the highest scholastic achievement in the field of financial administration. The award consists of a silver medal embedded in clear plastic and one year's subscription to the *Wall Street Journal*.

**THE ARTHUR YOUNG AND CO. FOUNDATION, INC., AWARDS** to exceptional senior students concentrating in accounting who are registered in the College of Business and Public Administration.

## AIR FORCE ROTC AWARDS

AFROTC ANGEL FLIGHT AWARD presented to the outstanding member of the AFROTC Angel Flight.

AIR FORCE TIMES AWARD presented to the Senior Cadet at each detachment who has distinguished himself by contributing materially to constructive public attention for his Cadet Corps.

ALUMNI CUP presented to the outstanding Flight in the Corps of Cadets.

ARNOLD AIR SOCIETY AWARD presented to the Advanced Cadet selected by the Arnold Air Society as the cadet who has contributed the most to the advancement of AFROTC through activities of the Arnold Air Society.

CHICAGO TRIBUNE ROTC AWARDS presented to freshmen and sophomores who display highest leadership and officer potential.

DISABLED AMERICAN VETERANS GOLD CUP awarded to the Senior Cadet who has displayed outstanding leadership, scholarship, and citizenship.

DISTINGUISHED AFROTC CADET AWARDS presented to those seniors who possess outstanding qualities of leadership and high moral character and who meet the prescribed standings in their academic and military studies.

GENERAL DYNAMICS AWARD presented to the Sophomore Cadet displaying outstanding leadership and scholarship qualities and who has been selected for Advanced AFROTC.

GOVERNOR'S CUP presented to the outstanding Squadron Commander in the Corps of Cadets.

PERSHING RIFLES REGIMENTAL AWARDS presented to the outstanding members of the Pershing Rifles Regiment and Pershing Rifles Squadron.

RESERVE OFFICERS ASSOCIATION AWARDS presented to the outstanding junior and senior cadets of the Cadet Corps.

SCABBARD AND BLADE COBLENTZ MEMORIAL CUP awarded to the outstanding commander in the Corps of Cadets.

SOCIETY OF AMERICAN MILITARY ENGINEERS AWARDS presented to a junior and a senior cadet displaying outstanding scholastic achievement and leadership and majoring in the field of engineering.

## ATHLETIC AWARDS

ATLANTIC COAST CONFERENCE AWARD—A plaque is awarded each year to a senior in each conference school for excellence in scholarship and athletics.

THE ALVIN L. AUBINOE BASKETBALL TROPHY—This trophy is offered by Alvin L. Aubinoe for the senior who has contributed most to the squad.

THE ALVIN L. AUBINOE FOOTBALL TROPHY—This trophy is offered by Alvin L. Aubinoe for the unsung hero of the current season.

THE ALVIN L. AUBINOE TRACK TROPHY—This trophy is offered by Alvin L. Aubinoe for the senior who has contributed most to the squad during the time he was on the squad.

JOHN T. BELL SWIMMING AWARD—To the year's outstanding swimmer or diver.

LOUIS W. BERGER TROPHY—Presented to the outstanding senior baseball player.

WILLIAM P. COLE, III, MEMORIAL LACROSSE AWARD—This award, offered by the teammates of William P. Cole, III, and the coaches of the 1940 National Champion team, is presented to the outstanding midfielder.

THE GEORGE C. COOK MEMORIAL SCHOLARSHIP TROPHY—Awarded annually to a member of the football team with the highest scholastic average.

**JOE DECKMAN-SAM SILBER TROPHY**—This trophy is offered by Joseph H. Deckman and Samuel L. Silber to the most improved defense lacrosse player.

**GEARY F. EPPLEY AWARD**—Offered by Benny and Hotsy Alperstein to the graduating male senior athlete who, during his three years of varsity competition, lettered at least once and attained the highest over-all scholastic average.

**HALBERT K. EVANS MEMORIAL TRACK AWARD**—This award, given in memory of "Hermie" Evans, of the Class of 1940, by his friends, is presented to the following graduating senior trackman.

**HERBERT H. GOODMAN TROPHY**—This trophy is offered by Herbert E. Goodman to the most outstanding wrestler of the year.

**CHARLES LEROY MACKERT TROPHY**—This trophy is offered by William K. Krouse to the Maryland student who has contributed most to wrestling while at the University.

**MARYLAND RING**—The Maryland Ring is offered as a memorial to Charles L. Linhardt, of the Class of 1912, to the Maryland man who is adjudged the best athlete of the year.

**CHARLES P. MCCORMICK TROPHY**—This trophy is offered by Charles P. McCormick to the senior letterman who has contributed most to swimming during his collegiate career.

**ANTHONY C. NARDO MEMORIAL TROPHY**—This trophy is awarded to the best football lineman of the year.

**EDWIN POWELL TROPHY**—This trophy is offered by the Class of 1913 to the player who has rendered the greatest service to lacrosse during the year.

**SILVESTER WATCH FOR EXCELLENCE IN ATHLETICS**—A gold watch, given in honor of former president of the University, R. W. Silvester, is offered annually to "the man who typifies the best in college athletics."

**TEKE TROPHY**—This trophy is offered by the Maryland Chapter of Tau Kappa Epsilon Fraternity to the student who during his four years at the University has rendered the greatest service to football.

**ROBERT E. THEOFELD MEMORIAL**—This trophy is presented by Dr. and Mrs. Harry S. Hoffman and is awarded to the golfer who most nearly exemplifies the competitive spirit and strong character of Robert E. Theofeld, a former member of the boxing team.

## MUSIC AWARDS

**ASSISTANT DIRECTOR'S AWARD** to the outstanding member of the Symphonic Band.

**DIRECTOR'S AWARD** to the concert band member who demonstrated the most improvement in musicianship during the year.

**KAPPA KAPPA PSI AWARD** to the most outstanding band member of the year.

**SIGMA ALPHA IOTA ALUMNAE AWARD** for outstanding musical performance.

**SIGMA ALPHA IOTA DEAN'S HONOR AWARD** for service and dedication.

**SIGMA ALPHA IOTA HONOR CERTIFICATE** to the senior with the highest scholastic average.

**SIGMA ALPHA IOTA LEADERSHIP AWARD** based on personality, student activities, fraternity service, and scholarship.

**TAU BETA SIGMA AWARD** to the outstanding band sorority member of the year.

Awards are presented to the members of the University Bands, the University Orchestras, and the Men's and Women's Glee Clubs who serve faithfully throughout the year.

## STUDENT GOVERNMENT AWARDS

Keys are awarded to the members of the Executive Committee of the Student Government Association, Men's League, Association of Women Students, and other organizations who faithfully perform their duties throughout the year.

## SCHOLARSHIPS AND GRANTS-IN-AID

All requests for information concerning scholarships and grants-in-aid should be addressed to the Director of the Office of Student Aid, University of Maryland, College Park, Maryland. Regulations and procedures for the award of scholarships are formulated by the Committee on Financial Aids.

The Board of Regents of the University authorizes the award of a limited number of scholarships each year to deserving students. Applicants are subject to the approval of the Director of Admissions insofar as qualifications for admission to the University are concerned. All recipients are subject to the academic and non-academic regulations and requirements of the University.

Scholarships and grants are awarded to young men and women based upon apparent academic ability and financial need. In making awards, consideration is given to character, achievement, participation in student activities and to other attributes which may indicate success in college. It is the intent of the Committee to make awards to those qualified who might not otherwise be able to provide for themselves an opportunity for higher education.

The recipient of the scholarship or a grant is expected to make at least normal progress toward a degree. Normal progress toward a degree is defined by the Academic Probation Plan.

The Committee on Financial Aids reserves the right to review the scholarship program annually and to make adjustments in the amounts and recipients of awards in accordance with the funds available and scholastic attainment.

The types of scholarships, grants and loan funds available follow:

### FULL SCHOLARSHIPS

The University awards fifty-six full scholarships covering board, lodging, fixed charges, fees and books. Not more than twenty of these scholarships may be held by out-of-state students and at least twelve are reserved for women. Scholastic achievement and participation in student activities are given primary consideration in the award of these scholarships.

### UNIVERSITY GRANTS

The University awards to deserving and qualified secondary school graduates a limited number of grants covering fixed charges only.

### GENERAL ASSEMBLY GRANTS

These grants are for fixed charges and are awarded by members of the Legislature, three for each Senator and one for each member of the House of Delegates. They may be awarded by a member of the House of Delegates or by a Senator only to persons in the county or in the legislative district of Baltimore City which the Delegate or Senator represents. Awards of such grants are subject to approval by the Committee on Scholarships and by the Director of Admissions as to qualifications for admission.

### SPECIAL ACADEMIC SCHOLARSHIPS

A limited number of scholarships is awarded each year to students of exceptional academic ability out of funds derived from campus enterprises. The amount of these scholarships varies depending upon the extent of need.

### TEACHER EDUCATION GRANTS

The General Assembly of Maryland provides grants equivalent to fixed charges to Maryland residents pursuing teacher education curricula on a full-time basis. Recipients agree to teach in Maryland public schools for at least two years immediately following graduation. The agreement form must be signed by the student and countersigned by the parent, guardian or other responsible adult.

### GENERAL STATE TUITION SCHOLARSHIPS

The General Assembly of Maryland provides a number of limited tuition scholarships to students entering college for the first time. These scholarships may be used in any approved institution of higher education within the State. At the University of Maryland, they cover the item listed as fixed charges. Awards are made by the State Scholarship Board based upon financial need and the results of a competitive examination.

## ENDOWED SCHOLARSHIPS AND GRANTS

The University has a number of endowed scholarships and special grants. These are paid for by income from funds especially established for the purpose. Brief descriptions of these awards follow:

**ALBRIGHT SCHOLARSHIP**—The Victor E. Albright Scholarship is open to graduates of Garrett County high schools who were born and reared in that county.

**ALCOA FOUNDATION TRAFFIC SCHOLARSHIP**—An award of \$500 is given to an outstanding junior student majoring in Transportation in the College of Business and Public Administration.

**ALPHA PHI OMEGA (EPSILON MU CHAPTER) SCHOLARSHIP**—This scholarship is awarded annually to a freshman student having a background in the Boy Scouts of America.

**ALUMNI SCHOLARSHIP**—The General Alumni Council of the University Alumni Association provides eleven scholarships in the amount of \$250 each to be awarded respectively to schools or colleges represented on the Alumni Council. The awards are based on scholarship, leadership and need.

**ALUMNI ASSOCIATION OF MONTGOMERY COUNTY SCHOLARSHIPS**—A limited number of scholarships are available to residents of Montgomery County.

**ALUMNI ASSOCIATION OF THE SCHOOL OF PHARMACY SCHOLARSHIPS**—The Alumni Association of the School of Pharmacy of the University of Maryland makes available annually scholarships to qualified pre-pharmacy students on the basis of worthiness, moral character, scholastic achievement and the need for financial assistance. These scholarships are open only to residents of the State of Maryland. Each scholarship not exceeding \$500.00 per academic year is applied in partial defrayment of fees and expenses at College Park.

**ALUMNI BAND SCHOLARSHIP**—A limited number of awards to freshmen are sponsored by the University of Maryland Band Alumni Organization. Recipients are recommended by the Music Department after a competitive audition held in the spring.

**ETHEL R. ARTHUR MEMORIAL SCHOLARSHIP**—This memorial scholarship fund has been established by Irving J. Cohen, M.D. At least one \$250.00 award is made each year by the Scholarship Committee. A preference is given to students from Baltimore.

**ALVIN L. AUBINOE STUDENT AID PROGRAM**—Scholarship grants up to \$500 per school year to students in engineering, preferably those studying for careers in civil engineering, architecture or light construction.

**BALTIMORE PANHELLENIC ASSOCIATION SCHOLARSHIP**—A scholarship is awarded annually by the Baltimore Panhellenic Association. This scholarship will be awarded to a student entering the junior or senior class, who is an active member of a sorority, who is outstanding in leadership and scholarship and who needs financial assistance and is recommended by the Office of the Dean of Women.

**BALTIMORE SUNPAPERS SCHOLARSHIP IN JOURNALISM**—The Board of Trustees of the A. S. Abell Foundation, Inc., contributes funds to provide one or more \$500 scholarships to students majoring in editorial journalism.

**BAYSHORE FOODS, INC. SCHOLARSHIP**—A grant of \$500 is made available annually by J. McKenny Willis and Son., Inc., Grain, Feed and Seed Company of Easton, Maryland, to an outstanding student in vocational agriculture in Talbot County who will matriculate in the College of Agriculture. This grant is assigned by the Committee on Scholarships in accordance with the terms of the award.

**SAMUEL WOLFE BLANKMAN GRANT**—The sum of \$100 is awarded each year to a foreign student on the basis of worth and need to be determined by the Committee on Scholarships. The student must be a permanent resident of a country other than the United States, its possessions, or Canada. He may be a member of any college or school in the University.

**BORDEN AGRICULTURAL AND HOME ECONOMICS SCHOLARSHIPS**—A Borden Agricultural Scholarship of \$300 is granted to that student in the College of Agriculture who has had two or more of the regularly listed courses in dairying and who, upon entering the senior year of study, has achieved the highest average grade of all other similarly eligible students in all preceding college work.

A Borden Home Economics Scholarship of \$300 is granted to that student in the College of Home Economics who has had two or more of the regularly listed courses in foods and nutrition and who, upon entering the senior year of study, has achieved the highest average grade of all other similarly eligible students in all preceding college work.

**COLORTONE GRAPHIC ARTS AND PUBLICATION SCHOLARSHIP**—A scholarship of \$500.00 is made available annually by the Colortone Press, Inc., of Washington, D. C., to a senior recommended by the Department of Journalism and Public Relations and majoring in public relations. The recipient is also offered an opportunity of a supervised internship during the summer preceding his senior year.

**GEORGE C. COOK SCHOLARSHIP**—A full scholarship is made available by the Maryland Educational Foundation in memory of the late George C. Cook. The scholarship shall be administered under the same rules as a University Scholarship. Preference shall be given to students interested in a career in business administration or marketing.

**DR. ERNEST N. CORY SCHOLARSHIP**—This award is made annually to an outstanding junior or senior recommended by the College of Agriculture, preferably one majoring in Entomology. The amount of the award will vary depending upon the earnings of a trust fund established in honor of Dr. Ernest N. Cory upon his retirement.

**DAIRY TECHNOLOGY SCHOLARSHIP AND GRANTS**—The Dairy Technology Society of Maryland and the District of Columbia provides a limited number of scholarships and grants-in-aid for students majoring in Dairy Products Technology. These awards are available both to high school graduates entering the University as freshmen and to students who have completed one or more years of their University curriculum. The purpose of these awards is to encourage and stimulate interest in the field of milk and milk products. The awards are based on scholarship, leadership, personality, need, experience, interest in and willingness to work in the field of dairy technology. These awards are made by the Committee on Scholarships and Grants-in-Aid in cooperation with the Dairy Technology Society.

**DELMARVA TRAFFIC CLUB SCHOLARSHIP**—An award of \$250 is given to a junior or senior student from the Delmarva Peninsula majoring in Transportation in the College of Business and Public Administration.

**DOUGLAS AIRCRAFT COMPANY SCHOLARSHIP**—An \$800.00 scholarship to be awarded to an outstanding and deserving senior student in aeronautical, electrical, or mechanical engineering in this order of preference. Candidates recommended by the University must be citizens of the United States and have the approval of the Scholarship Board of the Douglas Aircraft Company. Preference should also be given to students who indicate a willingness to accept employment in California.

**EXEL SCHOLARSHIP**—A substantial grant for endowed scholarships was made by Deborah B. Exel. These awards are made by the Committee on Scholarships to worthy students in accordance with the general principles underlying the award of all other scholarships.

**FIRE RESEARCH AND ACTUARIAL ASSOCIATION SCHOLARSHIPS**—Fifteen Awards are made annually for room, board, tuition, and fees to outstanding high school students enrolling in the Fire Protection Curriculum of the College of Engineering. Students residing in eleven states in the Conference area and the District of Columbia are eligible for these scholarships. Employment obligations are required. Recipients of scholarships are selected by the Scholarship Committee of the Inter-Regional Insurance Conference in cooperation with the Faculty Committee on Scholarships.

**ANNE ARUNDEL COUNTY VOLUNTEER FIREMEN'S ASSOCIATION GRANT**—This \$300 is awarded to a high school graduate who will enroll in the Fire Protection Curriculum in the College of Engineering. The award will be available to the recipient for normal period of time to complete the program being pursued. This grant is provided by the Anne Arundel County Volunteer Fireman's Association and the College of Engineering.

**BALTIMORE COUNTY VOLUNTEER FIREMAN'S ASSOCIATION GRANT**—This \$350 annual grant is awarded to a student who will enroll in the Fire Protection Curriculum in the College of Engineering. The award is normally for four years and is awarded to a student of high scholastic ability with a reputation of good character and outstanding fire service interest. This grant is provided by the Baltimore County Volunteer Fireman's Association.

**DISTRICT OF COLUMBIA FIRE FIGHTERS ASSOCIATION GRANT**—A \$150.00 grant is awarded to a student who has completed his freshman year or has advanced standing in the Fire Protection Curriculum. The award is made in cooperation with Fire Protection Department of the College of Engineering.

**DISTRICT OF COLUMBIA FIRE FIGHTERS ASSOCIATION, I.A.F.F. GRANT**—This award is made to a student who has completed his freshman year in the Fire Protection Curriculum of the College of Engineering. The award will be in the amount of \$150.00 per year to be applied to the expense of fixed charges, tuition and fees. This award is made in cooperation with the Fire Fighters Association and the Fire Protection Department of the College of Engineering.

**LADIES AUXILIARY TO THE MARYLAND STATE FIREMEN'S ASSOCIATION GRANT**—This \$500 grant is awarded to an outstanding high school graduate who will enroll in the Fire Protection Curriculum in the College of Engineering. The award is available to the recipient for the normal period of time to complete the program being pursued. This grant is provided by the Ladies Auxiliary of the Maryland State Firemen's Association and the College of Engineering.

**MARYLAND STATE FIREMEN'S ASSOCIATION GRANT**—A \$300 scholarship is awarded annually to an outstanding high school student who enrolls in the Fire Protection Curriculum of the College of Engineering. This scholarship is for four years and is awarded to a student of high scholastic ability with a reputation of good character and outstanding fire service interest. The award is provided by the Maryland State Firemen's Association.

**NATIONWIDE FOUNDATION FIRE SAFETY SCHOLARSHIP**—The expense of fixed charges, tuition and fees, not to exceed \$600.00 per year, for a maximum period of two years is awarded to a student who is entering his junior year of study in the Fire Protection Curriculum of the College of Engineering. This award is made in cooperation with the Director of Safety of The Nationwide Insurance Company and The Fire Protection Department of the College of Engineering.

**PRINCE GEORGES COUNTY VOLUNTEER FIREMEN'S ASSOCIATION GRANT**—An annual scholarship of \$300 is awarded to an outstanding high school student who enrolls in the Fire Protection Curriculum of the College of Engineering. The award is based on high scholastic ability, good character and outstanding fire service interest. The award is provided by the Prince Georges Volunteer Firemen's Association.

**FOOD FAIR STORES FOUNDATION SCHOLARSHIPS**—Each year a number of scholarships is made available by the Food Fair Stores Foundation to students from Anne Arundel, Baltimore, Harford, Prince Georges, Washington, Frederick, Montgomery, and Talbot counties and Baltimore City. Students receiving these scholarships may pursue any of the four-year curriculums of the University. The scholarships are for \$250 for an academic year.

**VICTOR FRENKIL SCHOLARSHIP**—A scholarship of \$250 is granted annually by Mr. Victor Frenkil of Baltimore to a student from Baltimore City in the freshman class of the University.

**FUTURE NURSES CLUBS SCHOLARSHIP**—A limited number of \$300.00 scholarships are made available by the Future Nurses Clubs of Maryland which are sponsored by the Women's Auxiliary of the Medical and Chirurgical Faculty of Maryland and the Maryland League of Nursing. These scholarships are available to freshmen students from Maryland preparing for nursing.

**GAMMA PHI BETA ALUMNI SCHOLARSHIP**—Two annual scholarships are available to teachers employed in the teaching field. The awards pay tuition costs of graduate course designed for training teachers of gifted children. The awards are made available by the Washington Alumnae Chapter of the Gamma Phi Beta Sorority. Recipients are recommended by the Coordinator of Special Education on the basis of scholarship and need.

**GENERAL MOTORS SCHOLARSHIP**—This scholarship granted annually to any young man or young woman who is an outstanding individual entering the freshman year. The amount of the stipend depends upon the demonstrated need of the individual. The College Scholarship Service evaluates the financial need in each case.

**GODDARD MEMORIAL SCHOLARSHIP**—Four \$500 scholarships are available annually under the terms of the James and Sarah E. R. Goddard Memorial Fund established through the wills of Morgan E. Goddard and Mary Y. Goddard. In granting these awards the Committee on Scholarships will consider outstanding scholastic achievement and financial need. Each award will be made on a year-to-year basis depending upon the accomplishment of the student.

**GORDON-DAVIS LINEN SUPPLY SCHOLARSHIP**—The Gordon-Davis Linen Supply Company provides a fund to be granted to worthy students by the Committee on Scholarships and Grants-in-Aid.

**ROSE L. GRANT SCHOLARSHIP**—At least \$500.00 each year is made available to be awarded by the Scholarship Committee in accordance with its established principles.

**JOHN WILLIAM GUCKEYSON MEMORIAL SCHOLARSHIP**—A scholarship of \$100.00 is granted annually by Mrs. Hudson Dunlap as a memorial to John William Guckeyson, an honored Maryland alumnus.

**JAMES HARTIN ENGINEERING SCHOLARSHIP AND DONALD PETER SHAW MEMORIAL SCHOLARSHIP**—These two scholarships of \$300.00 each are made available annually by Mr. & Mrs. David C. Hartin. The first is awarded to a male student in the College of Engineering and the second to a male student in any college other than Education, or to a female student in Nursing. These awards will be made annually by the Scholarship Committee to worthy students who are helping to earn their own college expenses.

**HASKINS AND SELLS FOUNDATION, INC. AWARD**—A scholarship of \$500 is provided for an exceptional senior student majoring in accounting in the College of Business and Public Administration.

**WILLIAM RANDOLPH HEARST FOUNDATION SCHOLARSHIPS**—These scholarships are made available through a gift of the Baltimore News American, one of the Hearst newspapers, in honor of William Randolph Hearst. Scholarships up to \$1000 are awarded annually to undergraduates pursuing a program of study in journalism. Scholarships up to \$1000 are awarded annually for graduate study in history. These scholarships are awarded by the Committee on Scholarships and Grant-in-Aid in cooperation with the Department of History and Journalism.

**IOTA LAMBDA SIGMA (NU CHAPTER) SCHOLARSHIP**—This scholarship is awarded annually to a male student who wishes to enroll or is enrolled in the Industrial Education curriculum. The student must be a resident of the State of Maryland and signify his intention of teaching in Maryland. The amount of the scholarship is \$200.00.

**KAPPA ALPHA THETA ALUMNI SCHOLARSHIP**—An annual award of \$500 is made available to a senior or graduate student studying speech therapy, by the Washington Alumni Chapter of the Kappa Alpha Theta Sorority. The recipient shall be recommended by the head of the Speech Department.

**KAPPA KAPPA GAMMA NURSING SCHOLARSHIP**—This \$100.00 Scholarship is made available annually by the Gamma Psi chapter of the Kappa Kappa Gamma Sorority to a worthy student preparing for a career in nursing. Preference for the award shall be given to an entering student from Maryland and she shall have a preference for its continuance while she is a student at College Park.

**VENIA M. KELLER GRANT**—The Maryland State Council of Homemakers' Clubs makes available this grant of \$100 which is open to a Maryland young man or woman of promise who is recommended by the College of Home Economics.

**KIWANIS SCHOLARSHIP**—The J. S. Ray Memorial Scholarship covering tuition is awarded by the Prince Georges Kiwanis Club to a male resident of Prince Georges County, Maryland, who, in addition to possessing the necessary qualifications for maintaining a satisfactory scholarship record, must have a reputation of high character and attainment in general all-around citizenship.

**SAMUEL J. LEFRAK SCHOLARSHIP**—A scholarship in honor of Geary F. Eppley, Dean of Men Emeritus, has been established by an alumnus Mr. Samuel J. Lefrak, President of the Lefrak Organization, Forest Hills, New York. The award of \$1,000 is made to a deserving sophomore who excels in both athletics and scholarship, to be used during his last two years at the University.

**LEDY CHEMICAL FOUNDATION SCHOLARSHIP**—A scholarship of \$500.00 is granted annually to a graduate or undergraduate student preparing for a career in the general field of chemistry. The award is made by the Committee on Scholarships and Grants-in-Aid in cooperation with the Department of Chemistry.

**HELEN ALETTA LINTHICUM SCHOLARSHIP**—These scholarships, several in number, were established through the benefaction of the late Mrs. Aletta Linthicum, widow of the late Congressman Charles J. Linthicum, who served in Congress from the Fourth District of Maryland for many years. They are granted to worthy young men and women who are residents of the State of Maryland and who have satisfactory high school records, forceful personality, a reputation for splendid character and citizenship, and the determination to get ahead.

**LIONS INTERNATIONAL SCHOLARSHIP**—An award of \$500.00 is available to a freshman who competes in the Lions Club (District 22-C) Annual Band Festival. A recipient is recommended by the Music Department after a competitive audition in the spring.

**THE M CLUB GRANTS**—The M Club of the University of Maryland provides each year a limited number of awards. They are granted by the Committee on Scholarship to applicants who show promise in sports other than football.

**DR. FRANK C. MARINO SCHOLARSHIP**—Dr. Frank C. Marino provides a \$200 annual scholarship in Nursing Education. As vacancies in this scholarship occur, it is awarded by the Committee on Scholarship to a student who demonstrates special interest and promise in this field.

**MARYLAND CONSUMER FINANCE SCHOLARSHIP**—A scholarship fund of \$500.00 per year is provided funds each year for the education of several promising young men. These grants are awarded by the Committee on Scholarships to applicants who qualify under the provisions of the Foundation.

**MARYLAND CONSUMER FINANCE SCHOLARSHIP**—A scholarship fund of \$500.00 per year is made available by the Maryland Consumer Finance Association. It may be awarded to one student or divided and awarded to two students. The awards are made to Maryland residents.

**MARYLAND MOTOR FLEET SUPERVISORS AWARD**—An award of \$200 is given to a junior student with an interest in motor fleet work majoring in transportation in the College of Business and Public Administration.

**MARYLAND PHARMACEUTICAL ASSOCIATION SCHOLARSHIP**—The Maryland Pharmaceutical Association makes available annually scholarships to pre-pharmacy students on the basis of worthiness, moral character, scholastic achievement and the need for financial assistance. Each scholarship not exceeding \$500.00 per academic year is used in partial defrayment of fees and expenses at College Park. These scholarships are open only to residents of the State of Maryland.

**EUGENE E. AND AGNES F. MEYER SCHOLARSHIPS**—A number of scholarships are made available each year to promising students in meeting the costs of furthering their education, with preferential consideration to children of persons employed in public service, including service in the armed forces and the judiciary.

**MORTAR BOARD SCHOLARSHIP**—The Mortar Board Scholarship is awarded annually to a women student on the basis of scholastic attainment, character, and need. The selection of the student for this award is made through the Office of the Dean of Women and a representative of Mortar Board in cooperation with the Committee on Scholarships.

**OMICRON NU AWARD**—This award is presented annually to the sophomore student in the College of Home Economics who attained the highest scholastic average during her freshman year.

**PENINSULA HORTICULTURAL SOCIETY SCHOLARSHIP**—The Peninsula Horticultural Society provides annually a \$200 scholarship to the most deserving junior or senior student, a resident of Maryland from the Eastern Shore counties, who is majoring in Horticulture or related subjects, particularly as they apply to the culture of fruits and vegetables.

**PHI BETA KAPPA SCHOLARSHIP**—A scholarship is awarded to the student who at the end of the junior year has attained the highest cumulative average in liberal sources and whose basic course program is in liberal studies.

**PHI ETA SIGMA SCHOLARSHIP**—A limited number of \$100 scholarships are available to young men entering the sophomore class and who have achieved an academic average of 3.5 or higher during the freshman year. Funds for the awards are made available by the Phi Eta Sigma Fraternity.

**PILOT FREIGHT CARRIERS, INC., AWARD**—A \$500 award is made to a senior student in the College of Business and Public Administration who has majored in transportation and who has demonstrated competence in the field of study. The award is made through the College of Business and Public Administration.

**READ'S DRUG STORES FOUNDATION SCHOLARSHIPS**—The Read's Drug Stores Foundation contributes annually several scholarships to pre-pharmacy students on the basis of worthiness, scholastic achievement, moral character and the need for financial assistance. Each scholarship not exceeding \$500.00 per academic year is applied to defray partially the fees and expenses at College Park, Maryland. Recipients must have been residents of the State of Maryland for at least one year prior to the awarding of the scholarship.

**MARY ELIZABETH ROBY MEMORIAL SCHOLARSHIP**—An endowed scholarship has been established by the University Park Republican Women's Club. Limited awards are made to women entering the junior or senior years who are studying in the field of political science. A preference is given to residents of Prince Georges County.

**DR. FERN DUEY SCHNEIDER GRANT**—A \$100.00 grant is available to a foreign woman student enrolled in the College of Education, and who has completed at least one semester in residence at the University. Funds for the grant are contributed by the Montgomery and Prince Georges County Chapters of the Delta Kappa Gamma Society.

**THE SEARS ROEBUCK FOUNDATION GRANTS**—Eight grants of \$300 each are provided by the Sears Roebuck Foundation to the sons of Maryland residents engaged in agricultural pursuits who enroll in the freshman class of the College of Agriculture. One \$300 grant is awarded each year to the sophomore student in the College of Agriculture who has proved to be the outstanding student holding a Sears Roebuck grant during the previous year. These grants are awarded annually by the Committee on Scholarships.

A limited number of similar grants from the Sears Roebuck Foundation are also available for students in the College of Home Economics.

**SOUTHERN STATES COOPERATIVE SCHOLARSHIPS**—Two scholarships are awarded each year to sons of Southern States members—one for outstanding work in 4-H Club and the other for outstanding work in FFA. The amount of each scholarship is \$300 per year and will continue for four years. These scholarships are awarded by the Committee on Scholarships and Grants-In-Aid in cooperation with the College of Agriculture.

**ADELE H. STAMP SCHOLARSHIP**—This scholarship of \$250.00 is awarded annually to a sophomore who is an active sorority member or pledge, who is outstanding in leadership and scholarship and who needs financial assistance. Funds for this scholarship are provided by the University of Maryland Panhellenic Association. The recipient is recommended by the office of the Dean of Women.

**STEEL CLUB OF BALTIMORE SCHOLARSHIP**—This is a renewable scholarship of \$500.00 per year. Male residents of Maryland who have expressed their intention of entering the steel industry on completion of their formal education are eligible.

**STEEL SERVICE CENTER SCHOLARSHIP**—A renewable scholarship of \$350.00 per year is made available by various steel clubs of Baltimore. The award is made in accordance with the general principles underlying all other scholarships.

**JANE G. S. TALIAFERRO SCHOLARSHIP**—Under the terms of the will of the late Janie G. S. Taliaferro a bequest has been made to the University of Maryland to provide scholarship aid to worthy students. The income of the estate amounting to \$350 annually is used as a scholarship to a worthy young man or young woman who qualifies.

**R. M. WATKINS SCHOLARSHIP**—This scholarship is made available under the same terms and conditions as a Full University Scholarship from funds provided by the Maryland Educational Foundation.

**WESTERN ELECTRIC SCHOLARSHIP**—Two scholarships are awarded to students in the College of Engineering. The amount of the scholarship covers cost of tuition, books and fees not to exceed \$800 nor to be less than \$400.

**WESTINGHOUSE AIR ARM DIVISION SCHOLARSHIP**—The Westinghouse Electric Corporation has established a scholarship to encourage outstanding students of engineering and the physical sciences. The scholarship is awarded to a sophomore student and is paid over a period of

three years in six installments of \$250. Students in electrical or mechanical engineering, engineering physics or applied mathematics are eligible for the award. Selection of the recipient is based on achievement as reflected by scholastic standing and general college record. The award is made by the Committee on Scholarships and Grants-In-Aid in cooperation with the College of Engineering.

**WOMEN'S CLUB OF BETHESDA SCHOLARSHIP**—Two \$250.00 scholarships have been made available to young women residents of Montgomery County by the Women's Club of Bethesda. Recipients must be accepted in the College of Education or the College of Nursing.

**THE ARTHUR YOUNG AND CO. FOUNDATION, INC. SCHOLARSHIP**—The Arthur Young and Co. Foundation, Inc., makes available a scholarship of \$750 for an exceptional senior student concentrating in accounting who is registered in the College of Business and Public Administration. This award is made by the Committee on Scholarships and Grants-In-Aid to cooperation with the College of Business and Public Administration.

## STUDENT LOANS

**NDEA STUDENT LOANS**—Loan funds are available under provision of the National Defense Education Act. The borrower must sign a note for the loan and agree to interest and repayment terms established by the University. Repayment of the loan begins nine months after the borrower ceases to be a full time student and must be completed within ten years thereafter. No interest is charged on the loan until the beginning of the repayment schedule. Interest after that date is to be paid at the 3 percent per annum.

The National Defense Education Act contains a provision which provides that up to fifty percent of a student loan plus interest may be cancelled in the event the borrower becomes a full time elementary or secondary school teacher. Such cancellation is to be at the rate of 10 percent a year to five years.

**NURSING STUDENT LOANS**—Loans up to \$1000 per year are available under provisions of the Nurses Training Act of 1964. The borrower must be a full-time student in pursuit of a baccalaureate or graduate degree in nursing, and able to establish financial need. Repayment begins one year after the borrower ceases to be a full-time student and must be completed within ten years thereafter. No interest is charged until the beginning of the repayment schedule. Interest after that date is to be paid at the rate of three percent per annum, or the "going Federal rate," whichever is greater.

Up to fifty percent of the loan plus interest may be cancelled in the event that the borrower is employed full-time as a nurse in a public or nonprofit institution or agency. Such cancellation is at the rate of ten percent per year. In the event of total or permanent disability or death, the borrower's obligation is automatically cancelled.

**CATHERINE MOORE BRINKLEY LOAN FUND**—Under the will of Catherine Moore Brinkley, a loan fund is available for worthy students who are natives and residents of Maryland.

**JOSEPH W. KINGHORN AND MORLEY A. JULL FUNDS**—Memorial trust funds have been established in honor of Joseph W. Kinghorn, first graduate of the University of Maryland Poultry Department. These funds are available as loans to students enrolled in the Poultry Department.

**EDNA B. MCNAUGHTON MEMORIAL LOAN FUND**—This fund has been established by Mrs. W. B. Clayton in memory of Edna B. McNaughton, who initiated and developed the program in Early Childhood Education at the University of Maryland. Priority is given to students enrolled in this program.

**PHI DELTA GAMMA LOAN FUND**—This fund has been established under essentially the same terms and conditions as the NDEA loans. Recipients must be recommended by the Sigma Chapter of the Phi Delta Gamma Sorority.

**JAN STEVEN AND SIDNEY RAPKE MEMORIAL LOAN FUND**—This fund has been established in memory of Jan Steven Rapke by his parents. Short-term, interest free loans are available to students in good standing to meet personal emergencies as they arise. It is the wish of the donors that the fund be administered with a minimum of formality.

**UNITED STUDENT AID FUNDS**—Loans up to \$1,000.00 per year are available from many banks to students at the University. Maximum interest on such loans is 6 per cent simple. Monthly installments are usually not less than \$25 nor more than \$100. Repayment begins ten months after the student ceases to be a full time student.

**SIEGFRIED E. WEISBERGER, JR. MEMORIAL FUND**—A memorial trust fund has been established in honor of Siegfried Weisberger, Jr., a Freshman student in Agriculture in 1958-59. Under terms of this loan, students in Agriculture may borrow money without interest for short term needs.

## PART-TIME EMPLOYMENT

**UNIVERSITY EMPLOYMENT**—The University offers dining hall and dormitory workshops permitting selected Maryland residents to earn part or all of their board and room. Other jobs on campus pay hourly rates according to the skill and education required.

**OFF-CAMPUS EMPLOYMENT**—A file of off-campus part-time jobs is maintained. Most of these are with local stores and business firms.

**COLLEGE WORK-STUDY PROGRAM**—Eligible students may seek employment under provisions of Title I-C of the Economic Opportunity Act. Part-time employment during the school year plus full-time employment during the summer may be combined with scholarships and loans to provide educational opportunities to qualified students.

## FOR ADDITIONAL INFORMATION . . .

*Admission* . . . . . DIRECTOR, OFFICE OF ADMISSIONS  
NORTH ADMINISTRATION BUILDING

*Housing* . . . . . DIRECTOR, HOUSING OFFICE  
NORTH ADMINISTRATION BUILDING

*Scholarships and Grants-in-aid  
Loans and Student Employment* . . . . . DIRECTOR, OFFICE OF STUDENT AID  
NORTH ADMINISTRATION BUILDING

*Student Life Information* . . . . . EXECUTIVE DEAN FOR STUDENT  
LIFE  
NORTH ADMINISTRATION BUILDING

*Counseling* . . . . . UNIVERSITY COUNSELING CENTER  
SHOEMAKER BUILDING

*Specific Program Information* . . . . . OFFICE OF THE DEAN OF THE  
RESPECTIVE COLLEGES

TO COMPLETE THE MAIL ADDRESS  
FOR THESE OFFICERS ADD:

UNIVERSITY OF MARYLAND  
COLLEGE PARK, MARYLAND  
20740













*CATALOG OF THE*  
COLLEGE  
OF  
AGRICULTURE  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*September 1, 1965*

*Number 3*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Re-entered at the Post Office at College Park, Maryland, as second class mail under the Act of Congress on August 24, 1912. Published twenty-nine times.



# Contents

## GENERAL

University Calendar	iv	Student Organizations	4
Board of Regents	vi	Student Judging Teams	5
Officers of The University	vii	Additional Information	5
Standing Committees, Faculty		Awards	5
Senate	xi	Academic Information	7
The College	1	Admission	7
General Information	1	Junior Standing	8
Special Advantages	2	Requirements for	
Coordination of Agricultural		Graduation	9
Work	2	Honors Program	9
Facilities and Equipment	3	Student Advisers	9
Cost	3	Electives	9
Air Science	4	Field and Laboratory	
Scholarships and Grants-		Practice	10
in-Aid	4	Freshman Year	10

## REQUIRED COURSES

Agriculture Curriculum	11	Botany	25
University Requirements	11	Conservation and Resource	
College Requirements	11	Development	26
Agriculture—General	12	Entomology	27
Agricultural Economics	13	Food Science	28
Agricultural Chemistry	15	Horticulture	29
Agricultural and Extension		Special Curricula	31
Education	15	Pre-Forestry	31
Agricultural Engineering	17	Pre-Theological	31
Agronomy—Crops and Soils	20	Pre-Veterinary	32
Crops	21	Special Students	33
Soils	22	Two-Year Program	33
Animal Science	23		

## COURSE OFFERINGS

Agriculture	34	Animal Science	49
Agricultural Economics	35	Botany	55
Agricultural and Extension		Entomology	61
Education	39	Food Science	64
Agricultural Engineering	42	Horticulture	65
Agronomy—Crops and Soils			
and Geology	44		

Agriculture Experiment Station	70
Agriculture Extension Service	71
Service and Control Programs	72

Faculty of the College	76
Supervising Teachers in Agricultural Education	88

# University Calendar, 1965-66

(TENTATIVE)

## *FALL SEMESTER, 1965*

### SEPTEMBER

- 13-17 Monday through Friday—Fall Semester Registration
- 20 Monday—Instruction begins

### NOVEMBER

- 24 Wednesday, after last class—Thanksgiving recess begins
- 29 Monday, 8:00 A.M.—Thanksgiving recess ends

### DECEMBER

- 22 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Monday, 8:00 A.M.—Christmas recess ends
- 17 Monday—Pre-exam Study Day
- 18-24 Tuesday-Monday—Fall Semester Examinations

## *SPRING SEMESTER, 1966*

### JANUARY-FEBRUARY

- 31-4 Monday through Friday—Spring Semester Registration
- 7 Monday—Instruction begins
- 22 Tuesday—Washington's Birthday, holiday

### MARCH

- 25 Friday—Maryland Day, not a holiday

### APRIL

- 7 Thursday, after last class—Easter recess begins
- 12 Tuesday, 8:00 A.M.—Easter recess ends

### MAY

- 11 Wednesday—AFROTC Day
- 25 Wednesday—Pre-exam Study Day
- 26-June 3 Thursday through Friday—Spring Semester Examinations
- 29 Sunday—Baccalaureate Exercises
- 30 Monday—Memorial Day, holiday

### JUNE

- 4 Saturday—Commencement Exercises

## *SUMMER SESSION, 1966*

### JUNE

- 20-21 Monday, Tuesday—Registration, Summer Session
- 22 Wednesday—Instruction begins
- 25 Saturday—Classes (Monday schedule)

### JULY

- 4 Monday—Independence Day, holiday
- 9 Saturday—Classes (Tuesday schedule)

### AUGUST

- 12 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1966*

### JUNE

- 13-17 Monday through Friday—Rural Women's Short Course

### AUGUST

- 1-5 Monday through Friday—4-H Club Week

### SEPTEMBER

- 6-9 Tuesday through Friday—Fireman's Short Course

# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

12-16 Monday-Friday—Fall Semester Registration

19 Monday—Instruction begins

### NOVEMBER

23 Wednesday, after last class—Thanksgiving recess begins

28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

21 Wednesday, after last class—Christmas recess begins

### JANUARY

3 Tuesday, 8:00 A. M.—Christmas recess ends

18 Wednesday—Pre-exam Study Day

19-25 Thursday-Wednesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

31-Feb. 3 Tuesday-Friday—Spring Semester Registration

### FEBRUARY

6 Monday—Instruction begins

22 Wednesday—Washington's Birthday, holiday

### MARCH

23 Thursday, after last class—Easter recess begins

28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

10 Wednesday—AFROTC Day

24 Wednesday—Pre-exam Study Day

25-June 2 Thursday-Friday—Spring Semester Examinations

28 Sunday—Baccalaureate Exercises

30 Tuesday—Memorial Day, holiday

### JUNE

3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

19-20 Monday-Tuesday—Registration, Summer Session

21 Wednesday—Instruction begins

24 Saturday—Classes (Monday schedule)

### JULY

4 Tuesday—Independence Day, holiday

8 Saturday—Classes (Tuesday schedule)

### AUGUST

11 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

MRS. JOHN L. WHITEHURST

*4101 Greenway, Baltimore, 21218*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT. BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### ASSISTANT TO THE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### ASSISTANT TO THE VICE PRESIDENT FOR ACADEMIC AFFAIRS

Leslie R. Bundgaard—*B.S., University of Wisconsin, 1948; M.S., 1949; Ph.D., Georgetown University, 1954.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schutz—*B.S., University of Maryland, 1938; M.S., 1940.*

#### DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

#### DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

#### ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

#### DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

#### ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

### *Emeriti*

#### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

#### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

#### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

### *Deans of the Schools and Colleges*

#### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

#### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

#### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

#### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

#### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

#### ACTING DEAN OF THE COLLEGE OF ENGINEERING

Russell B. Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY  
Homer W. Schamp, Jr.—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1926; *Ph.D.*, *Columbia University*, 1931.

ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna R. Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, 1939.

DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

DEAN OF THE SCHOOL OF LIBRARY SCIENCE

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

DEAN OF THE SCHOOL OF NURSING

Florence M. Gipe—*B.S.*, *Catholic University of America*, 1937; *M.S.*, *University of Pennsylvania*, 1940; *Ed.D.*, *University of Maryland*, 1952.

DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

*Directors of Educational Services and Programs*

ACTING DEAN FOR STUDENT LIFE

Francis A. Gray—*B.S.*, *University of Maryland*, 1943.

DEAN OF WOMEN

Helen E. Clarke—*B.S.*, *University of Michigan*, 1943; *M.A.*, *University of Illinois*, 1951; *Ed.D.*, *Teachers College, Columbia University*, 1960.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### ACTING DIRECTOR, COMPUTER SCIENCE CENTER

John P. Menard—*B.A., San Michael's College, 1954*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS, AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

THE COLLEGE OF AGRICULTURE OFFERS AN EDUCATIONAL PROGRAM designed to prepare students for careers in agricultural sciences, agricultural technology and agricultural business. Students receive a basic fundamental and cultural education, correlated with technical agricultural courses and related sciences.

The College of Agriculture is the oldest division of the University of Maryland at College Park. The institution was chartered in 1856 under the name of the Maryland Agricultural College. For three years the College was under private management. When Congress passed the Land Grant Act in 1862, the General Assembly of Maryland accepted it for the State and named the Maryland Agricultural College as the beneficiary. When the institution was merged in 1920 with the University of Maryland in Baltimore, the College of Agriculture took its place as one of the major divisions of this larger, more comprehensive organization.

In addition to teaching, the College of Agriculture includes the Agricultural Experiment Station and the Extension Service. They were established as the result of acts passed by Congress in 1887 and 1914 respectively. A more complete description of these two services appears later in this bulletin.

## GENERAL INFORMATION

Graduates of the College of Agriculture are trained for employment in scientific areas related to agriculture, in agricultural business and industry or with a local, state or Federal agency. Curricula in the College of Agriculture provide for broad training in cultural and scientific courses as well as in courses related to various areas of agricultural specialization. Programs are offered for: (1) those planning to pursue the agricultural sciences and who plan to do graduate study; (2) those planning to pursue the business activities in agricultural and related industries, and (3) those planning to pursue the technology of animal and plant production, the engineering, chemistry, and food processing of agricultural products as well as teaching, research and extension in agriculture.

Many professors conduct research studies in their respective disciplines. Through these studies the frontiers of knowledge are constantly being extended. These new findings are incorporated in courses thereby enriching the instruction in a dynamic agriculture.

The close relationship of extension specialists and extension agents with farmers and farm families enables workers in the College to evaluate the agricultural situation. New agricultural problems are brought to the atten-

## GENERAL INFORMATION

tion of the research worker and new developments are presented to farmers and their families.

The coordination of teaching, research and extension provides effective educational opportunities for students in the College. Many professors contribute to the research and extension programs concerned with agriculture and food production, the development of new varieties and processing procedures, as well as adjustments in agricultural production and marketing.

Workers in the College of Agriculture, through regulatory and service activities, are constantly working with actual problems associated with the improvement and maintenance of standards for farm products. Regulatory and control work extends over a wide range of activities and concerned with reducing losses due to insect pests and diseases; preventing and controlling serious outbreaks of diseases and pests of animals and plants; analyzing fertilizer, feed and lime for guaranteed quality; and analyzing and testing germination quality of seeds to insure better seeds for farm planting. Marketing services include Federal-state inspection, fresh egg law, dairy inspection, seed inspection, weight and measures and market news service.

### *Special Advantages*

The University of Maryland is within a few miles of the Agricultural Research Center of the United States Department of Agriculture. This is the largest, best manned, and best equipped agriculture research agency in the world. Also, the University of Maryland is within a few miles of the Washington, D. C., offices of the Department of Agriculture and other government departments, including the Library of Congress. Students can easily visit these agencies and become acquainted with their work. Such contacts have proved valuable to many University of Maryland graduates.

Also, it is not uncommon for men from these agencies to speak before classes at the University and to be guest speakers at student club meetings and otherwise take part in student activities. No other college of agriculture in the United States is physically located to offer like opportunities to its students.

### *Coordination of Agricultural Work*

The strength of the College of Agriculture of the University of Maryland lies in the close coordination of the instructional, research, extension, and regulatory functions within the individual departments, between the several departments, and in the institution as a whole. Instructors in the several departments are closely associated with the research, extension and regulatory work being carried on in their respective fields, and in many cases, devote a portion of their time to one or more of these types of activities. Close coordination of these four types of work enables the University to

provide a stronger faculty in the College of Agriculture, and affords a higher degree of specialization than would otherwise be possible. It insures instructors an opportunity to keep informed on the latest results of research, and to be constantly in touch with current trends and problems which are revealed in extension and regulatory activities. Heads of departments hold staff conferences to this end, so that the student at all times is as close to the developments in the frontiers of the several fields of knowledge as it is possible for an organization to put him.

### *Facilities and Equipment*

In addition to buildings, laboratories, libraries, and equipment for effective instruction in the related basic sciences and in the cultural subjects, the University of Maryland is provided with excellent facilities for research and instruction in agriculture. University farms, totaling more than 2,000 acres, are operated for instructional and investigational purposes. One of the most complete and modern plants for dairy and animal husbandry work in the country, together with herds of the principal breeds of dairy and beef cattle, and other livestock, provides facilities and materials for instruction and research in these industries. Excellent laboratory and field facilities are available in the Agronomy Department for breeding and selection in farm crops, and for soils research. The Poultry Department has a building for laboratories and classrooms, a plant comprising twenty acres, and flocks of the important breeds of poultry. A research farm is available for experimental testing under field conditions. The Horticulture Department is housed in a separate building, and has ample orchards, gardens and greenhouses for its various lines of work. A research farm is located near Salisbury where experimental work is carried on in the area of intense production. The Botany Department has excellent facilities available in laboratories, greenhouses, and field space for research in most phases of botany, especially in plant pathology, plant physiology, cytology and cytogenetics. A powerful X-ray machine, ultra centrifuge, and an electron microscope are the major pieces of equipment available; facilities for use of radio-isotopes are available for both teaching and research.

### *Costs*

Actual annual costs of attending the University include: \$270.00 fixed charges; \$96.00 special fees; \$440.00 board; \$320.00 lodging for Maryland residents, or \$420.00 for residents of other states and countries. A charge of \$400.00 is assessed to all students who are non-residents of the State of Maryland.

A matriculation fee of \$10.00 is charged all new students. A fee of \$10.00 must accompany a prospective student's application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee.

## GENERAL INFORMATION

*An Adventure in Learning*, the undergraduate catalog of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park, Maryland 20742.

### *Air Science*

Starting in September 1965, the Air Science programs at the University are all-voluntary. A two year program and a four year program are available. These programs are designed to fit the needs of eligible college male students who begin higher education at either a junior college or a four year college. The successful completion of either program qualifies the student for a reserve commission in the United States Air Force upon graduation.

For further details concerning Air Science, refer to *University General and Academic Regulations*, a publication available to all undergraduate students.

### *Scholarships and Grants-in-Aid*

A limited number of scholarships are available for agricultural students. These include awards granted by the Sears Roebuck Foundation, the Borden Company, Dr. Ernest N. Cory Trust Fund, the Danforth Foundation, the Ralston Purina Company, Southern States Cooperative, Inc., J. McKenny Willis and Sons, Dairy Technology Society of Maryland and District of Columbia, Kroeger Company and Peninsula Horticultural Society.

These scholarships and grants-in-aid are awarded by the Faculty Committee in accordance with the terms of the respective grants. More detailed information about these awards is contained in the publication *An Adventure in Learning*.

### *Student Organizations*

Students find opportunity for varied expression and growth in the several voluntary organizations sponsored by the College of Agriculture. These organizations are: Agricultural Economics Club, Agricultural Engineering Club, Block and Bridle Club, Collegiate 4-H Club, Dairy Science Club, Student Institute of Food Technology, Future Farmers of America, Agronomy Club, Poultry Science Club, and the Veterinary Science Club.

Alpha Zeta is a national agricultural honor fraternity. Members are chosen from students in the College of Agriculture who have met certain scholastic requirements and displayed leadership in agriculture.

The Agricultural Student Council is made up of representatives from the various student organizations in the College of Agriculture. Its purpose

is to coordinate activities of these organizations and to promote work which is beneficial to the College.

### *Student Judging Teams*

The College of Agriculture sponsors judging teams for dairy cattle, dairy products, horticultural products, livestock, meats and poultry. Team members are selected from students taking courses designed especially to train them for this purpose. Teams are entered in major contests where the students compete with teams from other state universities or agricultural colleges.

### *For Additional Information*

Detailed information concerning the American Civilization Program, fees and expenses, scholarships and awards, student life, and other material of a general nature, may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park, 20742. A detailed explanation of the regulations of student and academic life, may be found in the University publication titled, *University General and Academic Regulations*.

Requests for course catalogs for the individual schools and colleges should be directed to the deans of these respective units, addressed to:

#### COLLEGES LOCATED AT COLLEGE PARK:

Dean  
(College in which you are interested)  
The University of Maryland  
College Park, Maryland 20742

#### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean  
(School in which you are interested)  
The University of Maryland  
Lombard and Greene Streets  
Baltimore 1, Maryland 21201

### *Awards*

#### ALPHA ZETA MEDAL

The honorary agricultural fraternity of Alpha Zeta awards annually a medal to the agricultural student in the freshman class who attains the highest average record in academic work. The presentation of the medal does not elect the student to the fraternity, but simply indicates recognition of high scholarship.

## AWARDS

### APPLEMAN-NORTON AWARD

This award is made annually to a senior for excellence in botany.

### CARROLL E. COX AWARD

This cash award is made annually to the most outstanding graduate student in the Department of Botany.

### NATIONAL BLOCK AND BRIDLE AWARD

The National Block and Bridle awards annually a plaque to the member of the Block and Bridle Club who has done the most for the local club during the year.

### NATIONAL PLANT FOOD INSTITUTE AWARD

National Plant Food Institute awards annually the Agronomy Achievement Award to the outstanding junior or senior student in Agronomy. The amount of award is \$200.

### VIRGINIA DARE AWARD

The Virginia Dare Extract Company awards annually a plaque and \$25.00 to the outstanding student in ice cream manufacturing with an overall good standing in dairy.

### EDGAR P. WALLS AWARD

Dr. Edgar P. Walls awards annually a gold watch to the senior doing outstanding work in horticultural processing.

# Academic Information

## *Admission*

### FALL SEMESTER

All applications for full-time undergraduate admission for the Fall Semester at the College Park Campus must be received by the University on or before June 1. Any student registering for nine or more semester hours of work is considered a full-time student.

Under unusual circumstances, application will be accepted between June 1 and July 1. Applicants for full-time attendance filing after June 1 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by July 15.

### SPRING SEMESTER

The deadline for the receipt of applications for the Spring Semester is January 1.

### UNIVERSITY COLLEGE

The application deadlines and fees *do not* apply to students registering in the evening classes offered by the University College.

### GRADUATE SCHOOL

Application for admission to the Graduate School must be made by September 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline date is generally June 1.

### ENTRANCE REQUIREMENTS

The high school or preparatory school student who intends to apply for admission to the University should plan his secondary school program carefully. He should select a program that will prepare him adequately to begin college work at the college level. He should allow for the fact that his interests may change by selecting a secondary school program that will enable him, when he enters the University, to have a maximum freedom of choice among the various curricula offered at the University.

## ACADEMIC INFORMATION

Every candidate for admission to the University must normally present sixteen units of high school subjects. It is required that seven of the minimum sixteen units be in college preparatory subjects as follows:

English	4 units
Mathematics (preferably algebra)	1 unit
History or Social Sciences	1 unit
Biological or Physical Sciences	1 unit

The other units should be chosen to give the student as strong a preparation as possible for his work at the University. At least twelve of the units presented should be in college preparatory courses in academic subjects. Although there is no entrance requirement in foreign languages, two or more units are highly desirable for many programs and are suitable for all programs. Likewise it is desirable that each student offer two units in history or social sciences, and two units in the biological and physical sciences. It is strongly recommended that all students present a unit of plane geometry in addition to the one or two units of algebra.

It is recommended that the preparatory program in high school include:

English	4 units
Mathematics (college preparatory)	2 units
(Agricultural Engineering and Agricultural Chemistry—2 additional units)	
Biological and physical sciences	3 units
History or social sciences	2 units

Two units of foreign language are recommended for students in Agricultural Engineering, Agricultural Chemistry, Botany and Entomology.

Deviation from these recommendations is permitted, but should be undertaken only upon competent advice. An unwise selection of preparatory courses can effectively prevent the student from pursuing certain curricula at the University or materially increase the time necessary to complete a particular curriculum. Every prospective applicant should be certain that his preparation in mathematics is adequate for any program he might conceivably wish to enter. A special fee will be charged for all remedial work in mathematics with the exception of the course in solid geometry.

A well-planned program of college preparatory work contributes much to the success of a student in his college work. This fact has an important bearing in estimating whether a candidate for admission is likely to be successful in his work at the University.

### *Junior Standing*

To earn junior standing a student must complete 56 semester hours of academic credit with an average grade of "C" (2.0) or better.

Detailed regulations pertaining to junior standing are presented in full in the publication, *University General and Academic Regulations*.

### *Requirements for Graduation*

Each student must acquire a minimum of 120 semester hour credits in academic subjects. In addition requirements in health and physical education must be satisfied.

### *Honors Program*

The Honors Program of the College of Agriculture is made up of Departmental Honors Programs. The objective of the program is to recognize superior scholarship and to provide an opportunity for the excellent student to pursue more deeply those things which intrigue him or to partake more widely of those things which will add to his usefulness as a member of society. Honors Programs will be administered by Departmental Honors Committees and will be supervised by a College Committee on Honors Programs. All students in the College of Agriculture, who are in the top 20 percent of their class at the end of their first year, will automatically be considered for admission into the Honors Program. Of this group, no more than 50 percent will be admitted. Admission of students, who are sophomores or first semester juniors, will be considered upon application from any such student who stands in the upper 20 percent of his class. While application will be considered until the student enters his sixth semester, early participation in the program is highly preferable. Students admitted to the program enjoy some academic privileges. On the basis of the student's performance, during his participation in the Honors Program, the department may recommend the candidate for the appropriate degree without departmental honors, for the appropriate degree with (departmental) Honors, or for the appropriate degree with (departmental) High Honors. Successful completion of the Honors program will be recognized by a citation in the Commencement Program and by an appropriate entry on the student's record and diploma.

### *Student Advisers*

Each student in the College of Agriculture is assigned to a faculty adviser, either departmental or general. Departmental advisers consist of heads of departments or persons selected by them to advise students with curricula in their respective departments. General advisers are selected for students who have no definite choice of curriculum in mind, or who wish to pursue the general curriculum in agriculture.

### *Electives*

The electives in the suggested curricula which follow affords opportunity for those who so desire to supplement major and minor fields of study or to add to their general education.

With the advice and consent of those in charge of his registration, a student may make such modifications in his curriculum as are deemed advisable to meet the requirements of his particular need.

### *Field and Laboratory Practice*

The head of each department will help to make available opportunities for practical or technical experience along his major line of study for each student whose major is in that department and who is in need of such experience. For inexperienced students in many departments this need may be met by one or more summers spent on a farm.

### *Freshman Year*

The program of the freshman year in the College of Agriculture is similar for all curricula of the College. Its purpose is to afford the student an opportunity to lay a broad foundation in subjects basic to agriculture and the related sciences, to articulate beginning work in college with that pursued in high or preparatory schools, to provide opportunity for wise choice of programs in succeeding years, and to make it possible for a student before the end of the year to change from one curriculum to another, or from the College of Agriculture to a curriculum in some other college of the University with little or no loss of credit.

Students entering the freshman year with a definite choice of curriculum in mind are sent to departmental advisers for counsel as to the wisest selection of freshman electives from the standpoint of their special interests and their probable future programs. Students entering the freshman year with no definite curriculum in mind, are assigned to a general adviser, who assists with the choice of freshman electives and during the course of the year acquaints the students with opportunities in the upper curricula in the College of Agriculture and in the other divisions of the University. If by the close of the freshman year a student makes no definite choice of a specialized curriculum, he continues under the guidance of his general adviser in the General Agriculture curriculum.

# Required Courses

## AGRICULTURE CURRICULUM

All students in the College of Agriculture are required to complete a series of courses to satisfy University requirements, College requirements and departmental requirements. The remaining courses needed to complete a program of study are elected by the student with the approval of his adviser.

UNIVERSITY REQUIREMENTS	<i>Semester Credit Hours</i>
Eng. 1 or 21—Composition or Honors Composition	3
Eng. 3 4—World Literature	6
Social Science	6
History	6
Mathematics	3
Fine Arts or Philosophy	3
Hea. 5—Science and Theory of Health	2
Physical Education	2
Air Science (Optional)	

### COLLEGE OF AGRICULTURE REQUIREMENTS

Chem. 1, 3—General Chemistry	8
Speech 7—Public Speaking	2
Agr. 1—Introduction to Agriculture	1

### ELECT TWO OF THE FOLLOWING:

- Bot. 1—General Botany (4)
- Zool. 1—General Zoology (4)
- Microb. 1—General Microbiology (4)

Students failing to pass the pre-registration test in mathematics will be required to take Math. 1. (Special fee, \$45.00)

Students expecting to pursue the curriculum in either Agricultural Chemistry or Agricultural Engineering should, if qualified, take Math. 18 or 19. If not qualified they should take Math. 1.

DEPARTMENT REQUIREMENTS	74
-------------------------	----

Required courses are determined by the department for each specific curriculum and elective courses are approved by the adviser of the student's program.

A program of courses for the freshman year is essentially the same for all students. However, there are some variations in several curricula.

## GENERAL AGRICULTURE CURRICULUM

FRESHMEN	Semester	
	I	II
Eng. 1 or 21—Composition or Honors Composition		3
Social Science	3	3
Agri. 1—Introduction to Agriculture	1	..
Bot. 1—General Botany	4	..
Zool. 1—General Zoology	..	4
An. Sc. 1—Principles of Animal Science	3	..
Agron. 1—Crop Production	..	3
Mathematics	..	3
Health	2	..
Arts or Philosophy	..	3
Physical Education	1	1
Air Science (optional)		

## AGRICULTURE—GENERAL

The general agricultural curriculum provides for the development of a broad understanding in agriculture.

The flexibility of this curriculum permits selection of electives that will meet individual vocational plans in agriculture and agriculturally related business and industry.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

GENERAL AGRICULTURAL REQUIREMENTS	Semester	
	Credit	Hours
A. E. 107—Financial Analysis of the Farm Business	3	
A. E. 108—Farm Management	3	
R. Ed. 114—Rural Life and Education	3	
Agr. Engr. 56—Introduction to Farm Mechanics	2	
Agr. Engr. 1—Introduction to Agricultural Engineering	4	
Agron. 10—General Soils	4	
Agron. 107—Cereal Crop Production	3	
Agron. 108—Forage Crop Production	3	
Agron. 151—Cropping Systems	2	
An. Sc. 1—Principles of Animal Science	3	
An. Sc. 10—Feeds and Feeding	3	
Bot. 20—Diseases of Plants	4	
An. Sc. 40—Dairy Production	3	
Ent. 20—Insect Pests of Agricultural Crops	4	
Hort. 5 or 58—General Horticulture	3	
An. Sc. 62—Commercial Poultry Management	3	
Elect either of the following pairs of courses:		
Micro. 1 and Bot. 117	6	
B. A. 20, 21—Principles of Accounting	6	
Electives	20	

# AGRICULTURAL ECONOMICS

This curriculum combines training in the business, economic, and international aspects of agricultural production and marketing with the biological and physical sciences basic to agriculture. Programs are available for students in agricultural economics, agricultural business and in the area of international agriculture. Students desiring to enter agricultural marketing or businesses affiliated with agriculture may elect the agricultural business option, and students interested in foreign service may elect the international agriculture option. Students interested primarily in the broad aspects of production and management as it relates to the operation of a farm business may elect the agricultural economics option. In these programs, students are trained for employment in agricultural business and industry; for position in sales or management, with local, state, or federal agencies; and as extension workers, college teachers, researchers, farm operators or farm managers.

Courses for the freshman and sophomore years are essentially the same for all students. In the junior year the student elects the agricultural economics, agricultural business or international agricultural option according to his particular interest. Courses in this Department are designed to provide training in the application of economic principles to the production, processing, distribution, and merchandising of agricultural products as well as the inter-relationship of business and industry associated with agriculture in a dynamic economy. The curriculum includes courses in general agricultural economics, marketing, farm management, prices, land economics, agricultural policy, and international agricultural economics.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

## REQUIRED OF ALL STUDENTS

*Semester  
Credit Hours*

A. E. 50—Elements of Agricultural Economics.....	3
A. E. 51—Marketing of Agricultural Products.....	3
A. E. 106—Prices of Agricultural Products.....	3
A. E. 108—Farm Management .....	3
A. E. 112—Agricultural Policy and Programs.....	3
A. E. 114—World Agricultural Production and Trade.....	3
A. E. 199—Seminar .....	1
Econ. 31, 32—Principles of Economics.....	3
Math. 10 or equivalent—Introduction to Mathematics.....	3
Agron. 1—Crop Production .....	3
Agron. 10—General Soils .....	4
B. A. 130—Elements of Business Statistics I.....	3
An. Sci. 10—Feeds and Feeding.....	3

Select in consultation with adviser at least 21 credit hours in option chosen of which a minimum of six credit hours must be in Agricultural Economics and/or Economics.

## AGRICULTURAL ECONOMICS

### AGRICULTURAL ECONOMICS OPTION

A. E. 107—Financial Analysis of the Farm Business.....	3
A. E. 111—Economics of Resource Development.....	3
Econ. 130—Mathematical Economics .....	3
Econ. 131—Comparative Economic Systems.....	3
Econ. 132—Advanced Economic Principles .....	3
Econ. 140—Money and Banking.....	3
Agr. Engr. 1—Introduction to Agricultural Engineering.....	4
An. Sci. 1—Principles of Animal Science.....	3
Geog. 10—General Geography .....	3
Soc. 113—The Rural Community.....	3
Math. 11—Introduction to Mathematics.....	3
Electives .....	18

### AGRICULTURAL BUSINESS OPTION

A. E. 115—Marketing Animals and Animal Products.....	3
A. E. 116—Marketing Plant Products.....	3
A. E. 103—Economics of Agricultural Cooperation.....	3
A. E. 104—Economics of Agricultural Transportation.....	3
A. E. 119—Foreign Agricultural Economies.....	3
Econ. 132—Advanced Economic Principles.....	3
Econ. 140—Money and Banking .....	3
B. A. 20, 21—Principles of Accounting.....	6
B. A. 131—Elements of Business Statistics II.....	3
B. A. 140—Business Finance .....	3
B. A. 150—Marketing Management .....	3
B. A. 151—Advertising .....	3
B. A. 180—Business Law .....	3
Geog. 10—General Geography .....	3
Math. 11—Introduction to Mathematics.....	3
One course in Technology of Marketing (Animal Science or Horticulture)	
Electives .....	18

### INTERNATIONAL AGRICULTURE OPTION

A. E. 111—Economics of Resource Development.....	3
A. E. 119—Foreign Agricultural Economies.....	3
Econ. 130—Mathematical Economics .....	3
Econ. 131—Comparative Economic Systems.....	3
Econ. 132—Advanced Economic Principles .....	3
Econ. 140—Money and Banking.....	3
Foreign Language .....	6
Math. 11—Introduction to Mathematics.....	3
Geog. 10—General Geography .....	3
Geog. 41—Introductory Climatology .....	3
Bot. 20—Diseases of Plants.....	4
Bot. 117—General Plant Genetics .....	2
Agr. Engr. 1—Introduction to Agricultural Engineering.....	4
Ent. 1—Introductory Entomology.....	3
Geol. 1—Geology .....	3
Electives .....	17

## AGRICULTURAL CHEMISTRY

This curriculum insures adequate instruction in the fundamentals of both the physical and biological sciences. It may be adjusted through the selection of electives to fit the student for work in agricultural experiment stations, soil bureaus, geological surveys, food laboratories, fertilizer industries and those handling food products.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

AGRICULTURAL CHEMISTRY REQUIREMENTS	<i>Semester Credit Hours</i>
Chem. 15—Qualitative Analysis .....	4
Chem. 21—Quantitative Analysis .....	4
Chem. 35—Elementary Organic Lecture .....	2
Chem. 36—Elementary Organic Laboratory .....	2
Chem. 37—Elementary Organic Lecture .....	2
Chem. 38—Elementary Organic Laboratory .....	2
Chem. 123—Advanced Quantitative Analysis or .....	4
Chem. 150—Organic Quantitative Analysis .....	2
Agron. 10—General Soils .....	4
Bot. 1—General Botany .....	4
Geol. 1—Geology .....	3
Math. 20—Calculus I .....	4
Math. 21—Calculus II .....	4
Modern Languages .....	12
Phys. 20—General Physics .....	5
Phys. 21—General Physics .....	5
Speech 7—Public Speaking .....	2
Zool. 1—General Zoology .....	4
Electives in Biology .....	6
Electives in Agricultural Chemistry .....	11

## AGRICULTURAL AND EXTENSION EDUCATION

This Department combines a broad general training in agriculture with basic work in the natural sciences, the social sciences and the humanities.

Programs are available for students in agricultural education and agricultural extension education. The agricultural education curriculum is designed primarily for persons who wish to prepare for teaching agriculture in secondary schools. The agricultural extension curriculum is designed primarily for persons who desire to prepare to enter the Cooperative Extension Service. By completing six semester hours of physics, agricultural education majors may also qualify for certification to teach general science in the public schools of Maryland. Either option may lead to a variety of other educational career opportunities in agricultural business and industry, public service, the communications industry, and to research and college teaching. Students interested in rural ministry often select this curriculum.

## AGRICULTURAL AND EXTENSION EDUCATION

In addition to the regular entrance requirements of the University, involving graduation from a standard four-year high school, students electing either curriculum must present evidence of having acquired adequate agricultural experience after reaching the age of fourteen years, or plan to secure it prior to graduation.

In order to be admitted to student teaching or to extension field experience, each of which normally is taken in the senior year, a student must have a 2.3 grade point average or higher.

Students in the agricultural education curriculum are expected to participate in the Collegiate Chapter of the Future Farmers of America in order to gain needed training to serve as advisers of high school chapters of the FFA upon graduation.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

	<i>Semester Credit Hours</i>
DEPARTMENTAL REQUIREMENTS, BOTH OPTIONS	
An. Sc. 1—Principles of Animal Science.....	3
An. Sc. 10—Feeds and Feeding.....	3
Agron. 1—Crop Production, or	
Agron. 108—Forage Crop Production.....	3
Agron. 10—General Soils.....	4
Ag. Engr. 1—Introduction to Agricultural Engineering.....	4
Ag. Econ. 107—Financial Analysis of the Farm Business, or	
Ag. Econ. 108—Farm Management.....	3
R. Ed. 101—Teaching Materials and Demonstrations.....	2
R. Ed. 114—Rural Life in Modern Society.....	3
Ent. 20—Insect Pests of Agricultural Crops.....	4
Bot. 20—Diseases of Plants.....	4
Hort. 11—Greenhouse Management, or	
Hort. 58—Vegetable Production, or	
Hort. 62—Plant Propagation.....	3
English 14—Expository Writing.....	3
AGRICULTURAL EDUCATION OPTION	
R. Ed. 103—Student Teaching.....	5
R. Ed. 104—Student Teaching.....	1-4
R. Ed. 107—Introduction to Agricultural Education.....	2
R. Ed. 109—Teaching Secondary Vocational Agriculture.....	3
R. Ed. 111—Teaching Young and Adult Farmer Groups.....	1
Ed. 110—Human Development & Learning.....	6
Ed. 111—Foundations of Education.....	3
Ag. Engr. 56—Introduction to Farm Mechanics.....	2
Ag. Engr. 104—Farm Mechanics.....	2
Approved Electives.....	12

## AGRICULTURAL EXTENSION OPTION

R. Ed. 150—Extension Education . . . . .	2
R. Ed. 160—Extension Communications . . . . .	2
R. Ed. 161—4-H Organization and Procedure . . . . .	2
R. Ed. 121—Directed Experience in Extension Education . . . . .	1-5
Psych. 1—Introduction to Psychology . . . . .	3
Psych. 21—Social Psychology . . . . .	3
Psych. 110—Educational Psychology . . . . .	3
Ag. Econ. 111—Economics of Resource Development . . . . .	3
Approved Electives . . . . .	18

## AGRICULTURAL ENGINEERING

This Department offers an educational program in agricultural engineering technology for students in the College of Agriculture. These subjects may be grouped under five general classifications, farm power and machinery, farm structures, soil and water conservation engineering, farm electrification, and mechanics and equipment for agricultural materials handling and processing. The technological aspects covered in these courses are designed to complement the education received by students in other departments of the College of Agriculture.

Agricultural engineering, in the broadest sense, is the science of combining forces and materials of nature for the benefit of agriculture; as implied, an understanding of soil, plant, and animal sciences is the basis for intelligent applications of engineering principles in all phases of the agricultural industry. Because interrelated applications of all branches of engineering are found in agriculture, or even on a single, diversified farm, education for the profession is necessarily founded on a broad base of mathematical, physical and engineering science complemented by basic agricultural sciences. Although boundaries between generally recognized fields of engineering overlap in agricultural applications, the scope of the field together with personal preference generally leads to specialization in one of the four major areas of the profession.

The field of farm power and machinery offers opportunities to agricultural engineers specifically interested in agricultural mechanization. The farm equipment industry employs many graduates who conceive, design, develop, and test new power units and machines. Others are employed in distribution: sales, sales promotion or service.

Electric power and processing is concerned with productive applications of electricity in farm production and in other phases of the agricultural industry. Electricity is used not only for light and power but also for heating and cooling processes and for automatic control and operation of equipment. Agricultural engineers with such interests are employed by electric power suppliers and crop processing organizations.

## AGRICULTURAL ENGINEERING

Farm structures specialists are interested in farm buildings for structural design and functional use. Environmental requirements of animal shelters, crop storage and processing structures include control of temperature, humidity, and air movement for efficient utilization. Design must accommodate heat and moisture of respiration from animal or vegetable origin. Manufacturers and fabricators of structural units and facilities employ agricultural engineers for research and educational programs to promote their products.

Agricultural engineers specializing in soil and water control and conservation utilize hydraulics in irrigation, drainage, and soil erosion. Knowledge of how water flows over or through soil or infiltrates into soil are the tools of the engineer, but use of these tools is influenced by soil-moisture-plant relationships.

Farm management companies employ engineers to design soil and water conservation and other engineering systems for farms under their supervision or for individual farmers. Other sources of employment include contracting, farm management, irrigation equipment design or sales and service, and related enterprises.

State and federal institutions and agencies conduct programs of education and research in all areas of agricultural engineering. Research findings are frequently established in the agricultural industry through programs of action agencies such as the Agricultural Extension Service or the Soil Conservation Service. The agencies offer many opportunities for work in the field.

*University Requirements (see page 11)*

*College of Agriculture Requirements (see page 11)*

## AGRICULTURAL ENGINEERING

FRESHMAN YEAR	Semester	
	I	II
Agr. 1—Introduction to Agriculture.....	1	..
Agr. Engr. 1—Introduction to Agricultural Engineering....	4	..
An. Sc. 1—Principles of Animal Science.....	3	..
Chem. 1—General Chemistry .....	..	4
E. S. 1—Engineering Graphics.....	..	3
Eng. 1—Composition .....	3	..
Health Education .....	..	2
Math. 19—Elementary Analysis <sup>1</sup> .....	4	..
Math. 20—Calculus I.....	..	4
Physical Activities .....	1	1
Speech .....	..	3
Total .....	16	17

<sup>1</sup> Students who are not prepared to schedule Math. 19 based on the ACT test scores are advised to schedule Math. 1. (Special fee, \$45.00).

## AGRICULTURAL ENGINEERING

### AGRICULTURAL SCIENCES

Agr. 1—Introduction to Agriculture.....	1
Agron. 1—Crop Production .....	3
Agron. 10—General Soils .....	4
An. Sc. 1—Principles of Animal Science .....	3
Agron. 117—Soil Physics (optional with Series A Tech. electives) .....	(3)

### AGRICULTURAL ENGINEERING

Agr. Engr. 1—Introduction to Agricultural Engineering....	4
Agr. Engr. 86—Agricultural Engineering Shop Techniques....	1
Agr. Engr. 143—Agricultural Power and Machinery Analysis..	4
Agr. Engr. 144—Design of Operational Systems for Agriculture	3
Agr. Engr. 145—Soil and Water Conservation Engineering....	2
Agr. Engr. 189—Senior Problem .....	2

### BASIC SCIENCES

Chem. 1, 3—General Chemistry.....	8
Math. 19—Elementary Analysis <sup>1</sup> .....	4
Math. 20, 21, 22—Calculus I, II, III.....	12
Math. 66—Differential Equations for Scientists & Engrs.....	3
Phys. 20, 21—General Physics .....	10

### GENERAL ENGINEERING

E. S. 1—Engineering Graphics .....	4
E. S. 10—Introductory Mechanics .....	4
E. S. 20—Mechanics of Materials.....	3
E. S. 21—Dynamics .....	4
C. E. 90—Surveying I .....	3
C. E. 102 or M. E. 102—Fluid Mechanics .....	3
E.N.E.E. 60, 61, 62, 63—Principles of Electrical Engr.....	8
M. E. 1—Thermodynamics .....	3

### TECHNICAL ELECTIVES

Students will select Series A, B, or C.

#### SERIES A

C. E. 151—Materials of Engineering.....	3
C. E. 160, 161—Structural Design .....	8
C. E. 162, 163—Structural Analysis .....	6

Note: Student selecting Series A to take Agron. 117.

#### SERIES B

E. S. 30—Materials Science .....	3
C. E. 160—Structural Design .....	4
M. E. 101—Dynamics of Machines.....	2
M. E. 103—Materials Engineering .....	3
M. E. 106—Transfer Processes .....	3
Approved Electives .....	3

<sup>1</sup> Students who are not prepared to schedule Math. 19 based on the ACT test scores are advised to schedule Math. 1. (Special fee, \$45.00).

## AGRONOMY—CROPS, SOILS, AND GEOLOGY

### SERIES C

E. S. 30—Materials Science .....	3
C. E. 160—Structural Design .....	4
E.N.E.E. 122—Engineering Electronics .....	4
E.N.E.E. 123—Laboratory .....	1
Approved Electives .....	3

Note: Student selecting Series C will take E.N.E.E. 90, 91, 120, 121 in lieu of E.N.E.E. 60, 61, 62, 63.

## AGRONOMY—CROPS, SOILS, AND GEOLOGY

The Department of Agronomy offers instruction in production and breeding of forage crops, cereal crops, and tobacco; weed control; turf management; soil chemistry; soil fertility; soil physics; soil mineralogy; soil classification; and soil conservation. A technical or a general curriculum may be elected by a student in either crops or soils. A turf option is available in the general crops curriculum and a soil conservation option is available in the general soils curriculum. The technical curricula provide training in basic courses which will increase the student's understanding of the applied crops and soils courses. Training in these basic courses is required for advanced work in agronomy and is desired by many employers of students graduating in agronomy.

General curricula in crops and soils permit the student to confine his training to applied courses but students following these curricula are encouraged to elect some of the basic courses included in the technical curricula.

Depending on the electives chosen, students graduating in agronomy are well prepared for advanced study, trained for general farming, farm management, specialized seed production, extension work, soil conservation, or employment with commercial seed, fertilizer, chemical, or farm equipment companies. Turf specialists are in demand by park and road commissions, golf courses, and turf and landscape companies.

Students interested in geology have an excellent opportunity to prepare for advanced work in this field. Basic courses in mathematics, chemistry, and physics are as necessary for outstanding geologists as they are for other scientists and engineers. Although relatively few courses are offered in geology at the present time, these courses provide the students with a good geology background while they are taking the general courses required of all the University of Maryland students as well as the basic courses necessary for excellence in geology. By the proper selection of courses listed under the soils technical electives (which can be substituted for other departmental required courses) the student can obtain outstanding undergraduate training for advanced work in geology.

Additional information on opportunities in agronomy and geology may be obtained by writing to the Department of Agronomy.

## AGRONOMY—CROPS, SOILS, AND GEOLOGY

### CROPS

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

DEPARTMENTAL REQUIREMENTS (CROPS)	<i>Semester Credit Hours</i>
Agron. 10—General Soils .....	4
Agron. 103—Crop Breeding .....	2
Agron. 107—Cereal Crop Production .....	3
Agron. 108—Forage Crop Production .....	3
Agron. 151—Cropping Systems .....	2
Agron. 154—Weed Control .....	3
Agron. —Advanced Soils Courses .....	6
Bot. 11—Plant Taxonomy .....	3
Bot. 20—Diseases of Plants .....	4
Bot. 117—General Plant Genetics or	
Zool. 6—Genetics .....	2 or 4
Technical and General Courses for Crops Students (see explanation and lists below) .....	30
Electives .....	12

### *Technical Crops Curriculum*

A minimum of 20 of the 30 hours of technical and general courses required above must be selected from the technical courses; if the student desires to take more than 30 hours of technical courses they can be used as part of his 12 hours of electives or they can be substituted for other Department of Agronomy requirements with permission of the crops adviser.

### *General Crops and Turf Management Curricula*

Same as Technical Crops Curriculum except that the 20-hour minimum of courses from the technical group does not apply. Students in the turf management option must elect Agron. 109—Turf Management, Hort. 20—Introduction to the Art of Landscaping, and Hort. 107—Woody Plant Materials.

#### TECHNICAL COURSES WHICH MAY BE SELECTED BY THE CROPS STUDENT

Agr. 100  
 Bot. 101, 110, 111  
 Chem. 15, 19, 31, 33, 35, 36, 37, 38, 161, 163  
 C. S. 12, 20, 100  
 Math. 3, 10, 11, 14, 15, 18, 19, 20, 21, 22, 133  
 Phys. 1, 2, 10, 11

#### GENERAL COURSES WHICH MAY BE SELECTED BY THE CROPS STUDENT

A. E. 50, 108  
 Agr. Engr. 1, 56, 123  
 An. Sc. 1, 10, 40, 118

## AGRONOMY—CROPS, SOILS, AND GEOLOGY

Ent. 1, 4, 20

Geog. 30, 40, 41

Geol. 1, 2

Hort. 5, 20, 58, 107

Zool. 1

Agron.—Soils or crops courses not previously required (10 hrs.)

## SOILS

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

### DEPARTMENTAL REQUIREMENTS (SOILS)

*Semester  
Credit Hours*

Agron. 10—General Soils .....	4
Agron. 107—Cereal Crop Production.....	3
Agron. 108—Forage Crop Production.....	3
Agron. 114—Soil Classification and Geography.....	4
Agron. 116—Soil Chemistry .....	3
Agron. 117—Soil Physics .....	3
Agron.—Additional Advanced Soils courses.....	6
Technical and general courses for soils students (see explanation and lists below) .....	36
Electives .....	12

### *Technical Soils Curriculum*

A minimum of 30 of the 36 semester hours of technical and general courses required above must be selected from the technical group. If the student desires to take more than 36 semester hours of technical courses they can be used as part of his 12 hours of electives or they can be substituted for other Department of Agronomy requirements with permission of the soils adviser.

### *General Soils and Soil Conservation Curricula*

Same as Technical Soils Curriculum except that the 30-hour minimum of courses from the technical group does not apply. Students in soil conservation must elect Agron. 113—Soil Conservation, Geol. 1—Geology, and Bot. 10—Principles of Conservation.

### TECHNICAL COURSES WHICH MAY BE SELECTED BY THE SOILS AND GEOLOGY STUDENTS

Agr. 100

Bot. 101

Chem. 15, 19, 31, 33, 35, 36, 37, 38

C. S. 12, 20, 100

Math. 3, 10, 11, 14, 15, 18, 19, 20, 21, 22, 66, 133

Phys. 1, 2, 10, 11, 20, 21

Geog. 30 40, 41, 146 (Geology students only)

Geol. 1, 2, 119 (Geology students only)

Zool. 2, 6, 118, 190 (Geology students only)

GENERAL COURSES WHICH MAY BE SELECTED BY THE  
SOILS STUDENT

A. E. 50, 108

Agr. Engr. 1, 56, 123

An. Sc. 1, 10

Bot. 10, 11, 20, 102, 103, 117

Ent. 1, 20

Geog. 30, 40, 41, 146

Geol. 1, 2

Hort. 5, 20, 58

Zool. 1, 2, 6

Agron.—Any advanced agronomy courses not previously  
required (10 credit hrs.)

## ANIMAL SCIENCE

The curriculum in animal science offers a broad background in general education, basic sciences, agricultural sciences and the opportunity for a student to emphasize that phase of animal agriculture in which he is specifically interested. Each student will be assigned to an adviser according to the program he plans to pursue.

### *Objectives*

In addition to fulfilling the requirements of the University and the College of Agriculture, the following specific objectives have been established for the program in animal science:

1. To acquaint students with the role of animal agriculture in our cultural heritage.
2. To prepare students for careers in the field of animal agriculture. These include positions of management and technology associated with animal, dairy, or poultry production enterprises, positions with marketing and processing organizations, as well as in other allied fields such as feed, agricultural chemicals and equipment.
3. To prepare students for entrance to veterinary schools.
4. To prepare students for graduate study and subsequent careers in teaching, research and extension, both public and private.
5. To provide essential courses for the support of other academic programs of the University.

*University Requirements (see page 11)*

*College of Agriculture Requirements (see page 11)*

## BOTANY, CONSERVATION AND RESOURCE DEVELOPMENT

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

DEPARTMENT OF BOTANY REQUIREMENTS	Semester	
	Credit	Hours
Bot. 2—General Botany .....	4	
Bot. 11—Plant Taxonomy .....	3	
Bot. 20—Diseases of Plants .....	4	
Bot. 101—Plant Physiology .....	4	
Bot. 102—Plant Ecology .....	3	
Bot. 103—Plant Ecology Laboratory .....	1	
Bot. 111—Plant Anatomy .....	3	
Bot. 117—General Plant Genetics .....	2	
Bot. 199—Seminar .....	2	
Modern Language, preferably German .....	12	
Math. 10, 11—Introduction to Mathematics .....	6	
Microb. 1—General Microbiology .....	4	
Zool. 1—General Zoology .....	4	
Phys. 10, 11—Fundamentals of Physics .....	8	
Botany electives or related courses .....	10	
Electives .....	12	

The major student, with the approval of his advisor, will elect additional courses in Botany and related subjects to provide the best possible basic training and preparation in the area of his special interest. Students contemplating graduate work are strongly advised to take Calculus, Math. 14, 15 and Organic Chemistry, Chem. 31, 33 as a part of their undergraduate program.

## CONSERVATION AND RESOURCE DEVELOPMENT

The development and use of natural resources (including water, soil, minerals, fresh water and marine organisms, wildlife, air and human resources), are essential to the full growth of an economy.

The curriculum in Conservation and Resource Development (administered by the Botany Department), is designed to instill concepts of the efficient development and judicious use of natural resources. The study of the problems associated with the use of natural resources will acquaint students with their role in economic development, cultural heritage, and their necessary consideration in future expansion.

Students will prepare for professional and administrative positions in land and water conservation projects, for careers in operational, administrative, educational and research work in land use, rural area development, water resources, recreational area development and management, or for graduate study in any of several areas within the biological sciences.

## CONSERVATION AND RESOURCE DEVELOPMENT, ENTOMOLOGY

Students will pursue a broad education program and then elect subjects concentrated in a specific area of interest. A student will be assigned an adviser according to his area of interest.

Students will be encouraged to obtain summer positions which will give them technical laboratory or field experience in their chosen interest area.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

CONSERVATION AND RESOURCE DEVELOPMENT REQUIREMENTS	Semester Credit Hours
Agr. 100—Introductory Agricultural Biometrics.....	3
Agr. Engr. 1—Introduction to Agricultural Engineering.....	4
Agron. 10—General Soils .....	4
Bot. 2—General Botany .....	4
Bot. 10—Principles of Conservation.....	3
Bot. 11—Plant Taxonomy (or Bot. 153).....	3(2)
Bot. 102—Plant Ecology .....	2
Bot. 103—Plant Ecology Laboratory.....	1
Ent. 1—Introductory Entomology .....	3
Geog. 10—General Geography .....	3
Geol. 1—Geology .....	3
Math. 10, 11—Introduction to Mathematics (or Math. 18, 19)	3, 3
Micro. 1—General Microbiology .....	4
Zool. 2—Animal Phyla .....	4
Zool. 121—Animal Ecology .....	3
Electives .....	27

## ENTOMOLOGY

This curriculum prepares students for work in various types of entomological positions. Professional entomologists are engaged in fundamental and applied research, regulatory and control services with state and federal agencies, commercial pest control, sales and developmental programs with chemical companies and other commercial organizations, consulting work, extension work, and teaching.

A student wishing an undergraduate minor in entomology should take the introductory course (Ent. 1) and after consultation with the heads of both the major and minor departments will select courses that will contribute most to the end he has in view.

Most of the first two years of this curriculum is devoted to obtaining the essential background. In the junior and senior year there is opportunity for some specializing. Students contemplating graduate work are strongly advised to elect courses in physics, modern language, and biometrics.

## ENTOMOLOGY, FOOD-SCIENCE

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

### DEPARTMENT OF ENTOMOLOGY REQUIREMENTS

	<i>Semester Credit Hours</i>
Ent. 1—Introductory Entomology .....	3
Ent. 20—Insect Pests of Agricultural Crops .....	4
Ent. 105—Medical Entomology .....	3
Ent. 120—Insect Taxonomy and Biology .....	4
Ent. 122—Insect Morphology .....	4
Ent. 123—Insect Physiology .....	4
Ent. 198—Special Problems .....	2
Ent. 199—Seminar .....	2
Bot. 11—Plant Taxonomy .....	3
Bot. 20—Diseases of Plants .....	4
Chem. 31-33—Elements of Organic Chemistry .....	6
Math. 10, 11—Introduction to Mathematics .....	6
Micro. 1—General Microbiology .....	4
Zool. 2—The Animal Phyla or Zool. 118—Invertebrate Zoology ..	4
Zool. 6—Genetics .....	4
Electives .....	19

## FOOD SCIENCE

Food Science applies the fundamentals of the physical and biological sciences to the problems of procurement, preservation, processing, packaging, and marketing foods in a manner that would satisfy man's needs both nutritionally and aesthetically.

Opportunities for careers in food science exist in areas of meats, milk and milk products, fruits and vegetables, poultry and eggs, sea food, baby foods, confections, pet foods, cereals, flavors and colors, etc. Specific positions in Industry, Universities, and Government, include product development, production, engineering, research, quality control, technical service, technical sales, and teaching.

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

(Both Bot. 1 and Zool. 1 required)

### CURRICULUM REQUIREMENTS

	<i>Semester Credit Hours</i>
Production course <sup>2</sup> .....	3
Micro 1—General Microbiology .....	4
Micro. 131—Applied Microbiology .....	4
Phys. 10—Fundamentals of Physics .....	4
An. Sc. 15—Fundamentals of Nutrition .....	3
Chem. 31, 33—Elements of Organic Chem. ....	3, 3
Food 153—Experimental Food Science .....	3
Agr. Engr. 113—Mechanics of Food Processing .....	4
Fd. Sc. 1—Introduction to Food Science .....	3

<sup>2</sup>An. Sc. 1, Agron. 1, Hort. 5, Hort. 58, or Agr. Engr. 1.

## FOOD-SCIENCE, HORTICULTURE

Fd. Sc. 102, 103—Principles of Food Processing.....	3, 3
Fd. Sc. 111—Food Chemistry .....	3
Fd. Sc. 112—Analytical Quality Control.....	3
Ed. Sc. 113—Statistical Quality Control.....	3
Fd. Sc. 131—Food Product Research and Development.....	3
Fd. Sc. 199—Seminar .....	1
Electives .....	21

## HORTICULTURE

The Department of Horticulture offers instruction in pomology (fruits), olericulture (vegetables), floriculture (flowers), and ornamental horticulture, and processing of horticultural crops. These courses prepare students to enter commercial production and the horticultural industries such as fruit and vegetable processing, seed production and retail florists and nurseries. Students are likewise prepared to enter the allied industries as horticultural workers with fertilizer companies, equipment manufacturers, and others. Students who wish to enter specialized fields of research and teaching may take advanced work in the Department.

The new curriculum, Horticultural Education, is designed for persons who wish to prepare for teaching horticulture in the secondary schools. It provides basic training in horticulture and includes the necessary courses for teacher certification.

The Department of Horticulture is a cooperating department in the new curriculum Food Science.

## POMOLOGY AND OLERICULTURE CURRICULUM

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

### DEPARTMENT OF HORTICULTURE REQUIREMENTS

	<i>Semester Credit Hours</i>
Hort. 5, 6—Tree Fruit Production.....	3, 2
Hort. 58—Vegetable Production .....	3
Hort. 59—Berry Production .....	3
Hort. 62—Plant Propagation .....	3
Hort. 101—Technology of Fruits.....	3
Hort. 103—Technology of Vegetables .....	3
Hort. 161—Physiology of Maturation and Storage of Horticultural Crops .....	2
Hort. 199—Seminar .....	1
Bot. 20—Diseases of Plants.....	4
Bot. 101—Plant Physiology .....	4
Bot. 117—General Plant Genetics.....	2
Agron. 10—General Soils .....	4
Ent. 20—Insect Pests of Agricultural Crops.....	4
Elect one of the following courses:	
Bot. 125—Diseases of Fruit Crops (2)	
Bot. 126—Diseases of Vegetable Crops (2)	
A minimum of 3 additional Horticultural credits.....	3
Electives .....	31

## HORTICULTURE CURRICULA

### FLORICULTURE AND ORNAMENTAL HORTICULTURE CURRICULUM

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

DEPARTMENT OF HORTICULTURE REQUIREMENTS	Semester Credit Hours
Hort. 11—Greenhouse Management .....	3
Hort. 12—Greenhouse Management Laboratory.....	1
Hort. 16—Garden Management .....	2
Hort. 17—Flower Production Laboratory.....	1
Hort. 20—Introduction to the Art of Landscaping.....	3
Hort. 56—Basic Landscape Composition .....	2
Hort. 62—Plant Propagation .....	3
Hort. 100—Principles of Landscape Design.....	3
Hort. 105—Technology of Ornamentals .....	3
Hort. 107, 108—Woody Plant Materials.....	3, 3
Hort. 162—Fundamentals of Greenhouse Crop Production .....	3
Hort. 199—Seminar .....	1
Bot. 11—Plant Taxonomy .....	3
Bot. 20—Diseases of Plants .....	4
Bot. 101—Plant Physiology .....	4
Bot. 117—General Plant Genetics.....	2
Bot. 123—Diseases of Ornamental Crops.....	2
Agron. 10—General Soils .....	4
Ent. 116—Insect Pests of Ornamentals and Greenhouse Plants.....	3
Electives .....	25

### HORTICULTURAL EDUCATION CURRICULUM

*University Requirements* (see page 11)

*College of Agriculture Requirements* (see page 11)

DEPARTMENT OF HORTICULTURE REQUIREMENTS	
Hort. 11—Greenhouse Management .....	3
Hort. 12—Greenhouse Management Laboratory .....	1
Hort. 16—Garden Management .....	2
Hort. 17—Flower Production Laboratory.....	1
Hort. 20—Introduction to the Art of Landscaping.....	3
Hort. 56—Basic Landscape Composition .....	2
Hort. 62—Plant Propagation .....	3
Hort. 100—Principles of Landscape Design.....	3
Hort. 105—Technology of Ornamentals.....	3
Hort. 199—Seminar .....	1
Bot. 11—Plant Taxonomy .....	3
Bot. 20—Diseases of Plants .....	4
Bot. 101—Plant Physiology .....	4
Agron. 10—General Soils .....	4
Ent. 116—Insect Pests of Ornamentals and Greenhouse Plants.....	3
Ed. 111—Foundations of Education.....	3
R. Ed. 109—Teaching Secondary Agriculture .....	3
R. Ed. 101—Teaching Materials and Demonstrations.....	2
R. Ed. 103—Student Teaching .....	5

## SPECIAL CURRICULA

DEPARTMENT OF HORTICULTURE REQUIREMENTS ( <i>Continued</i> )	<i>Semester Credit Hours</i>
R. Ed. 104—Student Teaching .....	1-4
R. Ed. 107—Introduction to Agricultural Education.....	2
R. Ed. 111—Teaching Young and Adult Farmer Groups.....	1
Elect one of the following courses:	
Psych 110—Educational Psychology (3)	
Ed. 110—Human Development and Learning (6)	
A minimum of 12 additional Agricultural credits.....	12
Approved Electives .....	0-6
Total.....	124

## SPECIAL CURRICULA

### PRE-FORESTRY STUDENTS

The College of Agriculture is glad to cooperate with any student who wishes to attend the University to pursue courses which may be transferred to a standard forestry curriculum in another institution. The program which a student follows depends to some extent upon the forestry college he plans to enter. All pre-forestry students in the College of Agriculture are sent to the Department of Botany of the University for counsel and advice in these matters.

For residents of Maryland who have completed two years of pre-forestry and have satisfied requirements comparable to those at the University of Maryland and have been accepted in the School of Forestry at North Carolina State University, the University of Maryland will pay the non-resident fee for a period of two years.

### PRE-THEOLOGICAL STUDENTS

The College of Agriculture is glad to cooperate with the officers of any theological seminary who desire to urge its prospective students to pursue courses in agriculture as a preparation for the rural ministry. Such pre-theological students may enroll for a semester or more or for the usual four year training of the College. In either case they should enroll as members of the general curriculum in the College of Agriculture.

The electives of this curriculum may be used for such pre-theological requirements as seem desirable. Elections may be made from any of the offerings of the University such as history, political science, philosophy, agricultural economics, rural sociology, modern language, English, economics, rural sociology, natural science, education and the like. Students desiring to pursue a pre-theological program in the College of Agriculture of the University of Maryland, should consult with the president or admissions officer of the theological seminary which they expect to attend.

## SPECIAL CURRICULA

### PRE-VETERINARY STUDENTS

This program is designed for students desiring to prepare for the professional course in veterinary medicine.

A combined degree is available to students in pre-veterinary science. A student who has completed 90 academic semester credits at the University of Maryland and who has completed 30 additional academic semester credits at the University of Georgia or at any accredited veterinary school is eligible to make application for the Bachelor of Science degree from the University of Maryland.

Students wishing to apply for the combined degree must fulfill University and College requirements as set forth on page 11 and must also complete additional credits in Animal Science.

The State of Maryland has entered a regional agreement with the State of Georgia which makes ten spaces a year available in the School of Veterinary Medicine, University of Georgia. The spaces are to be filled on a competitive basis from among qualified applicants.

Candidates, to be considered qualified, must have:

- a. Completed the curriculum shown below with grades not less than "C" in any subject.
- b. Taken the veterinary medical aptitude test; and
- c. Must be a bona fide resident of Maryland.

All requirements must be completed by June prior to the September in which the student desires to matriculate in veterinary college. The pre-veterinary curriculum can be completed in two years but may be extended, thus making it possible for the applicant to select desirable electives.

After the names of the candidates have been received, a Georgia Board of Admissions will assemble at the University of Maryland and will interview each candidate and receive the transcript and all pertinent documents relating to him. The selection will be made by the Office of Admissions, University of Georgia.

The pre-veterinary curriculum should contain:

	<i>Semester Credit Hours</i>
Biological Sciences .....	12
Botany (4)	
Zoology (8)	
English and Speech .....	12

## SPECIAL CURRICULA

*Semester  
Credit Hours*

Physical Sciences .....	30
Inorganic Chemistry (8) .....	
Organic Chemistry (8) .....	
Mathematics (6) .....	
Physics (8) .....	
Animal Science .....	9
Genetics .....	3
Nutrition .....	3
Social Science <sup>3</sup> .....	3
History .....	6
Physical Education .....	2
Health .....	2
Air Science Optional .....	..

<sup>3</sup>This credit may be satisfied by examination at the University of Georgia.

### SPECIAL STUDENTS IN AGRICULTURE

Mature students may, with the consent of the Dean, register as special students and pursue a program of studies not included in any regular curriculum, but arranged to meet the needs of the individual. All University fees for these special students are the same as fees for regular students.

### TWO-YEAR PROGRAM—INSTITUTE OF APPLIED AGRICULTURE

The programs of study offered by the Institute will assist men and women interested in preparing for specific jobs in the broad fields of applied science and business in agriculture. Courses taken in these programs are not transferable for degree credits at the University of Maryland. However, students satisfactorily completing two years of study will be awarded an appropriate certificate. For additional information write: Director, Institute of Applied Agriculture.

# Course Offerings

The University reserves the right to withdraw or discontinue any course for which an insufficient number of students have registered to warrant giving the course. In such an event, no fee will be charged for transfer to another course.

Courses are designated by numbers as follows:

1 to 99: courses for undergraduates.

100 to 199: courses for advanced undergraduates and graduates. (Not all courses numbered 100 to 199 may be taken for graduate credit.)

200 to 299: courses for graduates only.

A course with a single number extends through one semester. A course with a double number extends through two semesters.

Courses not otherwise designated are lecture courses. The number of credit hours is shown by the arabic numeral in parentheses after the title of the course.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his program. Students obtain these schedules when they register.

## AGRICULTURE

### AGR. 1. INTRODUCTION TO AGRICULTURE. (1)

First semester. Required of all beginning freshmen and sophomores in agriculture. Other students must get the consent of the instructor. A series of lectures introducing the student to the broad field of agriculture. (Poffenberger.)

### AGR. 100. INTRODUCTORY AGRICULTURAL BIOMETRICS. (3)

First semester. Two lectures and one laboratory period per week. Introduction to fundamental concepts underlying the application of biometrical methods to agricultural problems with emphasis on graphical presentation of data, descriptive statistics, chi-square and t-tests, and linear regression and correlation.

### AGR. 200. AGRICULTURAL BIOMETRICS. (3)

Second semester. Two lectures and one laboratory period per week. Prerequisite, Agr. Biom. 100 or equivalent. A continuation of Agr. 100 with emphasis on analysis of variance and co-variance, multiple and curvilinear regression, sampling, experimental design and miscellaneous statistical technique as applied to agricultural problems.

### AGR. 202, 203. ADVANCED BIOLOGICAL STATISTICS. (2, 2)

First and second semesters. Prerequisite, approval of instructor. An advanced course dealing with specialized experimental designs, sampling techniques and elaborations of standard statistical procedures as applied to the animal and plant sciences.

AGR. 210. EXPERIMENTAL PROCEDURES IN THE AGRICULTURAL SCIENCES. (3)

First semester. Prerequisite, permission of instructor. Organization of research projects and presentation of experimental results in the field of agricultural science. Topics included will be: sources of research financing, project outline preparation, formal progress reports, public and industrial supported research programs, and popular presentation of research data. (Haut.)

## AGRICULTURAL ECONOMICS

*Professors:* BEAL, CURTIS, SMITH AND WALKER.

*Associate Professors:* FOSTER, ISHEE, McDONALD, MOORE, SCHERMERHORN AND WYSONG.

*Assistant Professor:* BENDER.

*Visiting Professor:* EVANS.

A. E. 50. ELEMENTS OF AGRICULTURAL ECONOMICS. (3)

Second semester. An introduction to economic principles of production, marketing, agricultural prices and incomes, farm labor, credit, agricultural policies, and government programs. (Wysong.)

A. E. 51. MARKETING OF AGRICULTURAL PRODUCTS. (3)

First semester. The development of marketing, its scope, channels, and agencies of distribution, functions, costs, methods used and services rendered. (Schermerhorn.)

*For Advanced Undergraduates and Graduates*

A. E. 100SF AND A. E. 101SF. AGRICULTURAL ESTIMATING METHODOLOGY. (3) (3) (Not for Grad. Credit)

First and second semesters, respectively. The history, organization and administration of, and services provided by the Statistical Reporting Service of the U. S. Department of Agriculture and the survey sampling methods used by that agency for computing the Department's official statistics on crops, livestock and livestock products, production, agricultural prices and farm employment. Emphasis is on statistical procedures used for preparing approximately 350 reports issued annually by the Crop Reporting Board of the U. S. Statistical Reporting Service. (Designed especially for foreign students in FAO and AID-Program of Technical Cooperation but very beneficial to any student interested in the area.) (Guellow.)

A. E. 103. ECONOMICS OF AGRICULTURAL COOPERATION. (3)

Second semester. A course in the development, expansion and consolidation of the cooperative method of business. Modern business organization and operating principles and practices related to farmer cooperatives are stressed. (Smith.)

## AGRICULTURAL ECONOMICS

### A. E. 104. ECONOMICS OF AGRICULTURAL TRANSPORTATION. (3)

First semester. The course deals with the unique nature of agriculture in broad perspective as it relates to economics of transportation of the products involved. It includes the development of agricultural transportation, effect of legislation and regulation upon this development, and growth of the intercarrier competition. Theories of rate making and classification of carriers are discussed from the standpoint of the effect of transportation costs and methods upon plant and industry location in agriculture. (Smith.)

### A. E. 106. PRICES OF AGRICULTURAL PRODUCTS. (3)

Second semester. An introduction to agricultural price behavior. Emphasis is placed on the use of price information in the decision-making process, the relation of supply and demand in determining agricultural prices, and the relation of prices to grade, time, location, and stages of processing in the marketing system. The course includes elementary methods of price analysis, the concept of parity, and the role of price support programs in agricultural decisions. (Bender.)

### A. E. 107. FINANCIAL ANALYSIS OF THE FARM BUSINESS. (3)

First semester. Application of economic principles to develop criteria for a sound farm business, including credit source and use, preparing and filing income tax returns, methods of appraising farm properties, the summary and analysis of farm records, leading to effective control and profitable operation of the farm business. (Wysong.)

### A. E. 108. FARM MANAGEMENT. (3)

Second semester. The organization and operation of the farm business to obtain an income consistent with family resources and objectives. Principles of production economics and other related fields are applied to the individual farm business. Laboratory period will be largely devoted to field trips and other practical exercises. (Ishee.)

### A. E. 109. INTRODUCTION TO ECONOMETRICS IN AGRICULTURE. (3)

First semester. An introduction to the application of econometric techniques to agricultural problems with emphasis on the assumptions and computational techniques necessary to derive statistical estimates, test hypotheses, and make predictions with the use of single equation models. Includes linear and non-linear regression models, internal least squares, discriminant analysis and factor analysis. (Suttor)

### A. E. 111. ECONOMICS OF RESOURCE DEVELOPMENT. (3)

First semester. Economic, political, and institutional factors which influence the use of land resources. Application of elementary economic principles in understanding social conduct concerning the development and use of natural and man-made resources. (Tuthill.)

### A. E. 112. AGRICULTURAL POLICY AND PROGRAMS. (3)

First semester. A study of public policies and programs related to the problems of agriculture. Description, analysis and appraisal of current policies and programs will be emphasized. (Beal.)

### A. E. 114. WORLD AGRICULTURAL PRODUCTION AND TRADE. (3)

First semester. World production, consumption, and trade patterns for agricultural products. International trade theory applied to agricultural products. National influences on international agricultural trade. (Foster.)

## AGRICULTURAL ECONOMICS

### A. E. 115. MARKETING ANIMALS AND ANIMAL PRODUCTS. (3)

First semester. Principles, functions, methods and channels of marketing animals and animal products including livestock and livestock products, dairy animals and dairy products, and poultry and poultry products. Application of basic principles of economics and marketing in a study of the role of the marketing system and development of measures of performance. (Smith.)

### A. E. 116. MARKETING PLANT PRODUCTS. (3)

Second semester. Principles, functions, methods and channels of marketing plant products including fruits, vegetables, horticultural specialties, grain and tobacco. Analyses of supply, demand, prices, grading, regulatory activities, and government programs and services. (Staff.)

### A. E. 119. FOREIGN AGRICULTURAL ECONOMIES. (3)

Second semester. Analysis of the agricultural economy of selected areas of the world. The interrelationships among institutions and values, such as government and religion, and the economics of agricultural organization and production. (Foster.)

### A. E. 198. SPECIAL PROBLEMS. (1-2) (2 cr. max.) (Not for grad. cr.)

First and second semesters and summer. Concentrated reading and study in some phase or problem in agricultural economics. (Staff.)

### A. E. 199. SEMINAR. (1, 1)

First and second semesters. Students will obtain experience in the selection, preparation and presentation of economic topics and problems which will be subjected to critical analysis. (Wysong.)

## *For Graduates*

### A. E. 200. APPLICATION OF ECONOMETRICS IN AGRICULTURE. (3)

First semester. Tools for analyzing demand and price behavior of agricultural products. Theories of least squares, estimation of structural economic relations in simultaneous equation systems, identification problems, and non-linear estimation techniques. (Ishee)

### A. E. 201. ADVANCED THEORY AND PRACTICE OF INTERNATIONAL AGRICULTURAL TRADE. (3)

Second semester. Advanced theory, policies and practice in international trade in agricultural products. Includes principal theories of trade and finance, agricultural trade policies of various countries, and the mechanics of how trade is conducted. (Moore.)

### A. E. 202. MARKET STRUCTURE IN AGRICULTURE. (3)

First semester. This course centers on the concept of market structure analysis, with application of principles developed to agricultural industries. The dimension of market structure is analyzed along with its impact on conduct and performance. Considerable time is spent on policy issues and the application of the antitrust laws to agricultural industries. (Moore.)

### A. E. 208. AGRICULTURAL PRICE AND INCOME POLICY. (3)

Second semester. The evolution of agricultural policy in the United States, emphasizing the origin and development of governmental programs, and their effects upon agricultural production, prices and income. (Beal.)

## AGRICULTURAL ECONOMICS

### A. E. 210. RURAL TAXATION AND PUBLIC FUNCTIONS. (3)

Second semester. Theory and practical problems in rural taxation. Major types of taxes are considered in detail. The tax system as it affects farmers and rural areas will be discussed. Major functional responsibilities of the different levels of governments are studied, with emphasis upon public services to rural areas and equal tax effort for support of equal functional programs.

(Walker.)

### A. E. 212. AGRICULTURE IN WORLD ECONOMIC DEVELOPMENT. (3)

First semester. Theories and concepts of what makes economic development happen. Approaches and programs for stimulating the transformation from a primitive agricultural economy to an economy of rapidly developing commercial agriculture and industry. Analysis of selected agricultural development programs in Asia, Africa and Latin America.

(Foster.)

### A. E. 214. ADVANCED AGRICULTURAL MARKETING. (3)

Second semester. Advanced study of the complex theoretical, institutional and legal factors governing both domestic and foreign agricultural trade, with particular attention given to policies and practices affecting cost and price.

(Beal.)

### A. E. 216. ECONOMICS OF AGRICULTURAL PRODUCTION. (3)

First semester. Study of the more complex problems involved in the long-range adjustments, organization and operation of farm resources, including the impact of new technology and methods. Applications of the theory of the firm, linear programming, activity analysis, and input-output analysis.

(Ishee.)

### A. E. 218. AGRICULTURAL ECONOMICS RESEARCH TECHNIQUES. (3)

First semester. Emphasis is given to philosophy and basic objectives of research in the field of agricultural economics. The course is designed to help students define a research problem and work out logical procedures for executing research in the social sciences. Attention is given to the techniques and tools available to agricultural economists. Research documents in the field will be appraised from the standpoint of procedures and evaluation of the research.

(Wysong.)

### A. E. 219. ADVANCED LAND ECONOMICS. (3)

Second semester. Application of micro and macro economic principles to the analyses of special problems related to land such as public direction of land use, tenure arrangements, conservation, and land reform movements.

(Wysong.)

### A. E. 220. INTERNATIONAL IMPACTS OF SELECTED AGRICULTURAL FORCES. (3)

Second semester. Selected agricultural forces (such as pressure of population on food supply) and their impacts on the political, social, and economic development of the world.

(Foster.)

### A. E. 300. SPECIAL TOPICS IN AGRICULTURAL ECONOMICS. (3)

First and second semester. This course is designed to offer students special subject matter in the field of Agricultural Economics. Subject matter taught in this course will be varied and will depend on the persons available for

## AGRICULTURAL AND EXTENSION EDUCATION

teaching unique and specialized phases of Agricultural Economics. The course will be taught by the staff or visiting Agricultural Economists who may be secured on lectureship or visiting professor basis. (Staff.)

### A. E. 301. SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS. (1-2) (4 cr. max.)

First and second semesters and summer: Intensive study and analysis of specific problems in the field of agricultural economics, which will provide information in depth in areas of special interest to the student. (Staff.)

### A. E. 302. SEMINAR. (1, 1)

First and second semesters: Students will participate through study of problems in the field, reporting to seminar members and defending positions adopted. Outstanding leaders in the field will present ideas for analyses and discussion among class members. Students involved in original research will present progress reports. Class discussion will provide opportunity for constructive criticism and guidance. (Curtis.)

### A. E. 399. RESEARCH. (6 hrs. M.S.; additional 6 hrs. Ph.D.)

First, second semesters and summer: Advanced research in agricultural economics. Credit according to work accomplished. (Staff.)

## AGRICULTURAL AND EXTENSION EDUCATION

*Professor:* CARDOZIER.

*Assistant Professor:* JOHNSON.

### *For Advanced Undergraduates*

### R. ED. 101. TEACHING MATERIALS AND DEMONSTRATIONS. (2)

First semester. Principles and practices of the demonstration method; construction and use of visual aids in teaching agriculture.

### R. ED. 103. STUDENT TEACHING. (5)

First semester. Prerequisite, satisfactory academic average and permission of instructor. Fulltime student teaching in an off-campus student teaching center under an approved supervising teacher of agriculture. Participating experience in all aspects of the work of a teacher of agriculture. (Cardozier.)

### R. ED. 104. STUDENT TEACHING. (1-4)

First semester. Prerequisite, satisfactory academic average and permission of instructor. Fulltime observation and participation in work of teacher of agriculture in off-campus student teaching center. Provides students opportunity to gain experience in the summer program of work, to participate in opening of school activities, and to gain other experience needed by teachers. (Cardozier.)

## AGRICULTURAL AND EXTENSION EDUCATION

- R. ED. 107. INTRODUCTION TO AGRICULTURAL EDUCATION. (2)  
An overview of the job of the teacher of agriculture; examination of agricultural education programs for youth and adults.
- R. ED. 109. TEACHING SECONDARY VOCATIONAL AGRICULTURE. (3)  
First semester. A comprehensive course in the work of high school departments of vocational agriculture. It emphasizes particularly placement, supervised farming programs, the organization and administration of Future Farmer activities, and objectives and methods in all-day instruction. (Cardozier.)
- R. ED. 111. TEACHING YOUNG AND ADULT FARMER GROUPS. (1)  
First semester. Characteristics of young and adult farmer instruction in agriculture. Determining needs for and organizing a course; selecting materials for instruction; and class management. Emphasis is on the conference method of teaching. (Smith.)
- R. ED. 121. DIRECTED EXPERIENCE IN EXTENSION EDUCATION. (1-5)  
Prerequisite, satisfactory academic average and permission of instructor. Full-time observation and participation in selected aspects of extension education in an approved training county. (Johnson.)
- R. ED. 161. 4-H ORGANIZATION AND PROCEDURE. (2)  
A study of the youth phase of cooperative extension work. Emphasis is placed on the philosophy, objectives, organization, leadership development and methods used in conducting 4-H Club work at the local and county level. (Johnson.)
- R. ED. 198. SPECIAL PROBLEMS. (1-3)  
Prerequisite, approval of staff. (Staff.)
- R. ED. 199. SEMINAR IN AGRICULTURAL EDUCATION. (1)  
Examination of current literature, reports and discussions of problems, trends, and issues in agricultural education. (Staff.)

### *For Advanced Undergraduates and Graduates*

- R. ED. 114. RURAL LIFE IN MODERN SOCIETY. (3)  
Examination of the many aspects of rural life that effect and are affected by, changes in technical, natural and human resources. Emphasis is placed on the role which diverse organizations, agencies, and institutions play in the education and adjustment of rural people to the demands of modern society.
- R. ED. 150. EXTENSION EDUCATION. (2)  
Second semester. The Agricultural Extension Service as an educational agency. The history, philosophy, objectives, policy, organization, legislation and methods used in extension work. (Johnson.)
- R. ED. 160. EXTENSION COMMUNICATIONS. (2)  
First semester. An introduction to communications in teaching and within an organization, including barriers to communication, the diffusion process and the application of communication principles person to person, with groups and through mass media. (Johnson.)

## AGRICULTURAL AND EXTENSION EDUCATION

- R. ED. 170, 171. CONSERVATION OF NATURAL RESOURCES. (3, 3)  
Laboratory fee, \$35.00. Designed primarily for teachers. Study of state's natural resources—soil, water, fisheries, wildlife, forests, and minerals—natural resources problems and practices. Extensive field study. First course concentrates on subject matter; second includes methods of teaching conservation. Courses taken concurrently in summer season.
- R. ED. 180, 181. CRITIQUE IN RURAL EDUCATION. (1, 1)  
Summer session only. Current problems and trends in rural education.

### *For Graduates*

- R. ED. 200. RESEARCH METHODS IN RURAL EDUCATION. (2-3)  
First semester. The scientific method, problem identification, survey of research literature, preparing research plans, design of studies, experimentation, analysis of data, and thesis writing. (Cardozier.)
- R. ED. 201 RURAL COMMUNITY ANALYSIS. (3)  
Analysis of structure and function of rural society and application of social understandings to educational processes. (Smith.)
- R. ED. 204. DEVELOPING RURAL LEADERSHIP. (2-3)  
Theories of leadership are emphasized. Techniques of identifying formal and informal leaders and the development of rural lay leaders.
- R. ED. 207, 208. SPECIAL TOPICS IN RURAL EDUCATION. (2, 2)  
Prerequisite, permission of instructor. (Staff.)
- R. ED. 209. RURAL ADULT EDUCATION. (2)  
Second semester. Principles of adult education applied to rural groups. Understanding adult motivation, ability and behavior. Effective methods of planning, organizing and conducting rural adult educational programs.
- R. ED. 215. SUPERVISION OF STUDENT TEACHING. (1)  
Summer session. Identification of experiences and activities in an effective student teaching program, responsibilities and duties of supervising teachers, and evaluation of student teaching. (Cardozier.)
- R. ED. 217. PROGRAM PLANNING AND EVALUATION IN AGRICULTURAL EDUCATION. (2-3)  
Second semester. Analysis of community agricultural education needs, selection and organization of course content, and criteria and procedures for evaluating programs. (Staff.)
- R. ED. 225. PROGRAM DEVELOPMENT IN EXTENSION EDUCATION. (2)  
Second semester. Prerequisite, R. Ed. 150 or equivalent. Principles and procedures of program planning and development in extension education. (Johnson.)
- R. ED. 240. AGRICULTURAL COLLEGE INSTRUCTION. (1)  
(Cardozier.)

## AGRICULTURAL ENGINEERING

### R. ED. 301. SPECIAL PROBLEMS. (1-3)

Prerequisite, approval of staff.

(Staff.)

### R. ED. 302. SEMINAR IN RURAL EDUCATION. (1, 1)

First and second semesters. Problems in the organization, administration, and supervision of the several agencies of rural education. Investigations, papers, and reports.

(Staff.)

### R. ED. 399. RESEARCH. (1-6)

(Staff.)

## AGRICULTURAL ENGINEERING

*Professors:* GREEN, BURKHARDT.

*Associate Professors:* GEINGER, WINN AND HARRIS.

*Assistant Professor:* MATTHEWS.

### AGR. ENGR. 1. INTRODUCTION TO AGRICULTURAL ENGINEERING. (4)

First and second semesters. Three lectures and one laboratory per week. Applications of mathematics, physics, and engineering techniques in the solution of agricultural engineering problems. Studies will include farm power and machinery, farm structures and electrification and soil and water conservation.

(Matthews.)

### AGR. ENGR. 56. INTRODUCTION TO FARM MECHANICS. (2)

First and second semesters. One lecture and one laboratory period a week. Laboratory fee, \$3.00. A study of the hand tools and power equipment and their safe use as it applies to mechanized farms. Principles and practice in arc and gas welding, cold metal and sheet metal work are provided. Also, tool fitting, woodworking, plumbing, blue print reading and use of concrete.

(Gienger.)

### AGR. ENGR. 86. AGRICULTURAL ENGINEERING SHOP TECHNIQUES. (1)

Second semester. One laboratory per week. Agricultural Engineering majors only. Shop techniques and procedures used in construction of experimental agricultural machinery and equipment. Operation principles of power and hand tools. A term problem to develop plans and techniques for construction, to select materials and to construct an assigned unit will be required.

(Burkhardt.)

### *For Advanced Undergraduates*

### AGR. ENGR. 104. FARM MECHANICS. (2)

First semester. Two laboratory periods a week. Laboratory fee, \$3.00. Available only to seniors in agricultural education. This course consists of laboratory exercises in practical farm shop and farm equipment maintenance, repair, and construction projects, and a study of the principles of shop organization and administration.

(Gienger.)

## AGRICULTURAL ENGINEERING

### AGR. ENGR. 113. MECHANICS OF FOOD PROCESSING. (4)

First semester. Three lectures and one laboratory. Prerequisite, Physics 1 or 10. Applications in the processing and preservation of foods of power transmission, hydraulics, electricity, thermodynamics, refrigeration, instruments and controls, materials handling and time and motion analysis. (Matthews.)

### AGR. ENGR. 123. AGRICULTURAL PRODUCTION EQUIPMENT. (3)

First semester. Two lectures and one laboratory per week. Prerequisite, Agr. Engr. 1. Principles of operation and functions of power and machinery units as related to tillage; metering devices; cutting, conveying and separating units; and control mechanisms. Principles of internal combustion engines and power unit components. (Matthews.)

### AGR. ENGR. 124. AGRICULTURAL MATERIALS HANDLING AND ENVIRONMENTAL CONTROL. (3)

Second semester. Two lectures and one laboratory per week. Prerequisite, Agr. Engr. 1. Characteristics of construction materials and details of agricultural structures. Fundamentals of electricity, electrical circuits, and electrical controls. Materials handling and environmental requirements of farm products and animals. (Matthews.)

### AGR. ENGR. 143 AGRICULTURAL POWER AND MACHINERY ANALYSIS. (4)

First semester. Three lectures and one laboratory per week. Prerequisites, Agr. Engr. 1, E.S. 21 and M.E. 1. Analysis of power units and equipment used for agricultural production with emphasis on functional design requirements. Fundamentals of power transmission, principles of internal combustion engines and force analysis. (Harris.)

### AGR. ENGR. 144. DESIGN OF OPERATIONAL SYSTEMS FOR AGRICULTURE. (3)

Second semester. Two lectures and one laboratory per week. Prerequisite, Math. 21 and Phys. 21. Principles and engineering requirements of agricultural environmental control. Included are studies of controlling heat and moisture produced by animals and crops, static loading of farm structures and electrical components as related to environment and materials handling. (Harris.)

### AGR. ENGR. 145. SOIL AND WATER CONSERVATION ENGINEERING. (2)

Second semester. Two lectures per week. Prerequisites, C.E. 90 and M. E. 102. Applications of engineering and soil sciences in erosion control, drainage, irrigation and watershed management. Principles of agricultural hydrology and design of water control and conveyance systems. (Green.)

### AGR. ENGR. 189. SENIOR PROBLEM. (2)

Prerequisite, approval of Department. Students will select individual projects, prepare design, conduct, experiment or analyze experimental data and present both an oral and written report to Departmental faculty. (Staff.)

### AGR. ENGR. 198. SPECIAL PROBLEMS IN FARM MECHANICS. (1-3)

First and second semesters. Prerequisite, approval of Department. Not acceptable for majors in agricultural engineering. Problems assigned in proportion to credit. (Gienger.)

## AGRONOMY—CROPS, SOILS AND GEOLOGY

### *For Graduates*

#### AGR. ENGR. 201. SPECIAL TOPICS IN AGRICULTURAL ENGINEERING. (3)

First and second semesters. Two lectures and one laboratory period per week. Timely topics in specialized areas of agricultural engineering will be selected as needed by graduate students; for example, Instrumentation for Agricultural Engineering Research. (Staff.)

#### AGR. ENGR. 301. SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING. (1-6)

First and second semesters. Summer session. Work assigned in proportion to amount of credit. (Staff.)

#### AGR. ENGR. 302. SEMINAR. (1, 1)

First and second semesters. Prerequisite, permission of instructor. (Harris.)

#### AGR. ENGR. 399. RESEARCH. (1-6)

Credit according to work accomplished. (Staff.)

## AGRONOMY—CROPS, SOILS, AND GEOLOGY

*Professors:* MILLER, ROTHGEB AND STREET.

*Associate Professors:* AXLEY, CLARK, DECKER, KRESGE AND STRICKLING.

*Assistant Professors:* BEYER, DEAL, COLBY, FANNING, FERNOW, NEWCOMER AND SIEGRIST.

### CROPS

#### AGRON. 1. CROP PRODUCTION. (3)

Second semester. Two lectures and one laboratory period a week. Culture, use, improvement, adaptation, distribution, and history of field crops. (Clark.)

### *For Advanced Undergraduates and Graduates*

#### AGRON. 103. CROP BREEDING. (2)

First semester, alternate years. (Offered 1966-67.) Prerequisite, Bot. 117 or Zool. 6. Principles and methods of breeding annual self and cross-pollinated plants and perennial forage species. (Beyer.)

#### AGRON. 104. TOBACCO PRODUCTION. (3)

Second semester. Three lectures a week. Prerequisite, Bot. 1. A study of the history, adaptation, distribution, culture, and improvement of various types of tobacco, with special emphasis on problems in Maryland tobacco production. Physical and chemical factors associated with yield and quality of tobacco will be stressed. (Street.)

#### AGRON. 107. CEREAL CROP PRODUCTION. (3)

First semester, alternate years. (Offered 1966-67.) Two lectures and one laboratory period a week. Prerequisite, Bot. 1. Study of the principles and practices of corn, wheat, oats, barley, rye, and soybean production. (Rothgeb.)

**AGRON. 108. FORAGE CROP PRODUCTION. (3)**

Second semester. Two lectures and one laboratory period a week. Prerequisite, Bot. 1. Study of the production and management of grasses and legumes for quality hay, silage, and pasture. (Decker.)

**AGRON. 109. TURF MANAGEMENT. (2)**

First semester, alternate years. (Offered 1967-68.) Two lectures a week. Prerequisite, Bot. 1. A study of principles and practices in management of turf for lawns, golf courses, athletic fields, playgrounds, airfields, and highway planting. (Deal.)

**AGRON. 151. CROPPING SYSTEMS. (2)**

Second semester. Two lectures a week. Prerequisite, Agron. 1 or equivalent. The coordination of information from various courses in the development of balanced cropping systems, appropriate to different objectives in various areas of the state and nation. (Clark.)

**AGRON. 152. SEED PRODUCTION AND DISTRIBUTION. (2)**

Second semester, alternate years. (Offered 1966-67.) One lecture and one laboratory period a week. Prerequisite, Agron. 1 or equivalent. A study of seed production, processing, and distribution; federal and state seed control programs; seed laboratory analysis; release of new varieties; and maintenance of foundation seed stocks. (Newcomer.)

**AGRON. 154. WEED CONTROL. (3)**

First semester, alternate years. (Offered 1967-68.) Two lectures and one laboratory period a week. Prerequisite, Agron. 1 or equivalent. A study of the use of cultural practices and chemical herbicides in the control of weeds. (Colby.)

*For Graduates*

**AGRON. 201. ADVANCED CROP BREEDING. (2)**

First semester, alternate years. (Offered 1967-68.) Two lectures a week. Prerequisite, Agron. 103 or equivalent. Genetic, cytogenetic, and statistical theories underlying methods of plant breeding. A study of quantitative inheritance, herterosis, heritability, interspecific and intergeneric hybridization, polyploidy, sterility mechanisms, inbreeding and outbreeding, and other topics as related to plant breeding. (Beyer.)

**AGRON. 204. TECHNIC IN FIELD CROP RESEARCH. (2)**

Second semester, alternate years. (Offered 1966-67.) Two lectures a week. Field plot technic, application of statistical analysis to agronomic data, and preparation of the research project.

**AGRON. 205. ADVANCED TOBACCO PRODUCTION. (2)**

First semester, alternate years. (Offered 1967-68) Two lectures a week. Prerequisite, permission of instructor. A study of the structural adaptation and chemical response of tobacco to environmental variations. Emphasis will be placed on the alkaloids and other unique components. (Street.)

**AGRON. 207. ADVANCED FORAGE CROPS. (2)**

First semester, alternate years. (Offered 1966-67.) Two lectures a week. Prerequisites, Bot. 101, Chem. 31, or equivalent, or permission of instructor.

## AGRONOMY—CROPS, SOILS AND GEOLOGY

A fundamental study of physiological and ecological responses of grasses and legumes to environmental factors, including fertilizer elements, soil moisture, soil temperature, air temperature, humidity, length of day, quality and intensity of light, wind movement, and defoliation practices. Relationship of these factors to life history, production, chemical and botanical composition, quality, and persistence of forages will be considered. (Decker.)

### AGRON. 208. RESEARCH METHODS. (2)

Second semester. Prerequisite, permission of staff. Development of research viewpoint by detailed study and report on crop research of the Maryland Experiment Station or review of literature on specific phases of a problem. (Staff.)

### AGRON. S210. CROPPING SYSTEMS. (1)

Summer session only. An advanced course primarily designed for teachers of vocational agriculture and county agents. It deals with outstanding problems and the latest developments in the field.  
Additional courses under CROPS AND SOILS.

## SOILS

### AGRON. 10. GENERAL SOILS. (4)

Second semester. Three lectures and one laboratory period a week. Prerequisite, Chem. 1 or permission of instructor. A study of the fundamentals of soils including their origin, development, relation to natural sciences, effect on civilization, physical properties, and chemical properties. (Kresge.)

### *For Advanced Undergraduates and Graduates*

### AGRON. S110. SOIL MANAGEMENT. (1)

Summer session only. An advanced course primarily designed for teachers of vocational agriculture and county agents dealing with factors involved in management of soils in general and of Maryland soils in particular. Emphasis is placed on methods of maintaining and improving chemical, physical, and biological characteristics of soils. (Strickling.)

### AGRON. 111. SOIL FERTILITY PRINCIPLES. (3)

First semester, alternate years. (Offered 1966-67.) Three lectures a week. Prerequisite, Agron. 10. A study of the chemical, physical, and biological characteristics of soils that are important in growing crops. Soil deficiencies of physical, chemical, or biological nature and their correction by the use of lime, fertilizers, and rotations are discussed and illustrated. (Strickling.)

### AGRON. 112. COMMERCIAL FERTILIZERS. (3)

Second semester. Three lectures a week. Prerequisites, Agron. 10 or permission of instructor. A study of the manufacturing of commercial fertilizers and their use in soils for efficient crop production. (Axley.)

### AGRON. 113. SOIL CONSERVATION. (3)

First semester, alternate years. (Offered 1966-67.) Two lectures and one laboratory period a week. Prerequisite, Agron. 10 or permission of instructor. A study of the importance and causes of soil erosion, and methods of soil erosion control. Special emphasis is placed on farm planning for soil conservation. The laboratory period will be largely devoted to field trips.

**AGRON. 114. SOIL CLASSIFICATION AND GEOGRAPHY. (4)**

Second semester. Three lectures and one laboratory period a week. Prerequisite, Agron. 10, or permission of instructor. A study of the genesis, morphology, classification and geographic distribution of soils. The broad principles governing soil formation are explained. Attention is given to the influence of geographic factors on the development and use of the soils in the United States and other parts of the world. The laboratory periods will be largely devoted to the field trips and to a study of soil maps of various countries.

(Fanning.)

**AGRON. 116. SOIL CHEMISTRY. (3)**

First semester, alternate years. (Offered 1966-67.) One lecture and two laboratory periods a week. Prerequisite, Agron. 10, or permission of instructor. A study of the chemical composition of soils; cation and anion exchange; acid, alkaline and saline soil conditions; and soil fixation of plant nutrients. Chemical methods of soil analysis will be studied with emphasis on their relation to fertilizer requirements.

(Axley.)

**AGRON. 117. SOIL PHYSICS. (3)**

First semester, alternate years. (Offered 1967-68.) Two lectures and one laboratory period a week. Prerequisite, Agron. 10 and a course in physics, or permission of instructor. A study of physical properties of soils with special emphasis on relationship to soil productivity.

(Strickling.)

**AGRON. 119. SOIL MINERALOGY. (4)**

First semester, alternate years. (Offered 1967-68.) Two lectures and two laboratory periods a week. Prerequisite, permission of instructor. A study of the fundamental laws and forms of crystal symmetry and essentials of crystal structure; structure, occurrence, association and use of minerals; and determination of minerals by means of their morphological chemical and physical properties. Particular attention is given to soil-forming minerals. Laboratory periods will be devoted to a systematic study of about 75 minerals.

Additional courses under CROPS AND SOILS.

(Siegrist.)

*For Graduates*

**AGRON. 250. ADVANCED SOIL MINERALOGY. (3)**

First semester, alternate years. (Offered 1966-67.) Three lectures a week. Prerequisites, Agron. 10, Agron. 119 and permission of instructor. A study of the structure physical-chemical characteristics and identification methods of soil minerals, particularly clay minerals, and their relationship to soil genesis and productivity.

(Fanning.)

**AGRON. 251. ADVANCED METHODS OF SOIL INVESTIGATION. (3)**

First semester, alternate years. (Offered 1967-68.) Three lectures a week. Prerequisites, Agron. 10 and permission of instructor. An advanced study of the theory of the chemical methods of soil investigation with emphasis on problems involving application of physical chemistry.

(Axley.)

**AGRON. 252. ADVANCED SOIL PHYSICS. (3)**

Second semester, alternate years. (Offered 1967-68.) Two lectures and one laboratory period a week. Prerequisite, Agron. 10 and permission of instructor. An advanced study of physical properties of soils with special emphasis on relationship to soil productivity.

(Strickling.)

## AGRONOMY—CROPS, SOILS AND GEOLOGY

### AGRON. 253. ADVANCED SOIL CHEMISTRY. (3)

Second semester, alternate years. Offered 1966-67.) One lecture and two laboratory periods a week. Prerequisite, permission of instructor. A continuation of Agron. 116 with emphasis on soil chemistry of minor elements necessary for plant growth. (Axley.)

Additional courses under CROPS AND SOILS.

## CROPS AND SOILS

### *For Advanced Undergraduates*

### AGRON. 198. SPECIAL PROBLEMS IN AGRONOMY. (1)

Second semester. Prerequisites, Agron. 10, 107, 108 or permission of instructor. A detailed study, including a written report of an important problem in agronomy. (Staff.)

### AGRON. 199. SENIOR SEMINAR. (1)

First semester. Reports by seniors on current scientific and practical publications pertaining to agronomy. (Miller.)

### *For Graduates*

### AGRON. 260. RECENT ADVANCES IN AGRONOMY. (2-4)

First semester. Two hours each year. Total credit four hours. Prerequisite, permission of instructor. A study of recent advances in agronomy research. (Staff.)

### AGRON. 302. AGRONOMY SEMINAR. (1, 1)

First and second semesters. Total credit toward M. S. 2; toward Ph.D., 6. Prerequisite, permission of instructor. (Staff.)

### AGRON. 399. RESEARCH.

First and second semesters. Credit according to work done. (Staff.)

## GEOLOGY

### GEO. 1. GEOLOGY. (3)

First and second semester. Three lectures or two lectures and one laboratory each week. A study dealing primarily with the principles of dynamical and structural geology. Designed to give a general survey of the rocks and minerals composing the earth; the movement within it; and its surface features and the agents that form them. (Fernow.)

### GEO. 2. HISTORICAL AND STRATIGRAPHIC GEOLOGY. (3)

Second semester. Three lectures or two lectures and one laboratory each week. Prerequisite, Geol. 1. A study of the earth's history as revealed through the principles of stratigraphy and the processes of physical geology, with emphasis on the formations and the geologic development of the North American continent. (Fernow.)

*For Advanced Undergraduates and Graduates*

**GEOL. 119. SOIL MINERALOGY. (4)**

First semester, alternate years. (Offered 1967-68.) Two lectures and two laboratory periods a week. Prerequisite, permission of instructor. A study of the fundamental laws and forms of crystal symmetry and essentials of crystal structure; structure, occurrence, association and use of minerals; and determination of minerals by means of their morphological, chemical and physical properties. Particular attention is given to soil-forming minerals. Laboratory periods will be devoted to a systematic study of about 75 minerals. (Siegrist.)

**ANIMAL SCIENCE**

**ANIMAL:**

*Professors:* FOSTER AND GREEN.

*Associate Professors:* BURIC, LEFFEL AND YOUNG.

**DAIRY:**

*Professor:* DAVIS.

*Associate Professors:* HEMKEN, STEWART, WILLIAMS AND VANDERSALL.

*Lecturer:* PLOWMAN.

**POULTRY:**

*Professors:* SHAFFNER AND COMBS.

*Associate Professors:* QUIGLEY, CREEK AND WILCOX.

**VETERINARY SCIENCE:**

*Professor:* DEVOLT.

*Assistant Professor:* BROWN.

**AN. SC. 1. PRINCIPLES OF ANIMAL SCIENCE. (3)**

First semester. Two lectures and one, two-hour laboratory period per week. A comprehensive course, including the development of animal science, its contributions to the economy, characteristics of animal products, factors of efficient and economical production and distribution. (Young.)

**AN. SC. 10. FEEDS AND FEEDING. (3)**

First semester. Credit not allowed for An. Sc. major. Two lectures and one laboratory period per week. Prerequisites, Chem. 1 and 3. Elements of nutrition, source, characteristics and adaptability of the various feedstuffs to the several classes of livestock. A study of the composition of feeds, the nutrient requirements of farm animals and the formulation of economic diets and rations for livestock. (Leffel.)

## ANIMAL SCIENCE

### AN. SC. 20. FUNDAMENTALS OF ANIMAL PRODUCTION. (3)

First semester. Two lectures and one laboratory period per week. This course deals with the adaptation of beef cattle, sheep, swine and horses to significant and specific uses. Breeding, feeding, management practices and criteria for evaluating usefulness are emphasized. (Young.)

### AN. SC. 21. SEMINAR. (1)

First semester. One lecture per week. Reviews, reports and discussions of pertinent subjects in Animal Science. (Staff.)

### AN. SC. 22. LIVESTOCK EVALUATION. (3)

Second semester. Two lectures and one laboratory period per week. Prerequisite, An. Sc. 20 or permission of instructor. A study of type and breed characteristics of beef cattle, sheep and swine and of the market classes of livestock which best meet present day demands. One field trip of about two days duration is made during which students participate in the Annual Eastern Intercollegiate Livestock Clinic. (Buric.)

### AN. SC. 40. DAIRY PRODUCTION. (3)

First semester. Two lectures and one laboratory period per week. Prerequisite, An. Sc. 1. A comprehensive course in dairy breeds, selection of dairy cattle, dairy cattle nutrients, feeding and management. (Hemken.)

### AN. SC. 41. DAIRY CATTLE TYPE APPRAISAL. (1)

Second semester. Freshmen, by permission of instructor. Two laboratory periods. Analysis of dairy cattle type with emphasis on the comparative judging of dairy cattle. (Stewart.)

### AN. SC. 61. ADVANCED POULTRY JUDGING. (1)

First semester. Prerequisite, An. Sc. 1. One lecture or laboratory period per week. The theory and practice of judging and culling by physical means is emphasized, including correlation studies of characteristics associated with productivity. Contestants for regional collegiate judging competitions will be selected from this class.

### AN. SC. 62. COMMERCIAL POULTRY MANAGEMENT. (3)

Second semester. Prerequisite, An. Sc. 1. A symposium of finance, investment, plant layout, specialization, purchase of supplies and management problems in baby chick, egg, broiler and turkey production; foremanship, advertising, selling, by-products, production and financial records. Field trips required.

### *For Advanced Undergraduates and Graduates*

### AN. SC. 109. FUNDAMENTALS OF NUTRITION. (3)

Second semester. Three lectures per week. Prerequisite, Org. Chem. 31. A study of the fundamental role of all nutrients in the body, including their digestion, absorption, and metabolism. Dietary requirements and nutritional deficiency syndromes of laboratory and farm animals and man will be considered. This course will be for both graduate and undergraduate credit, with additional assignments given to the graduate students. (Combs.)

**AN. SC. 110. APPLIED ANIMAL NUTRITION. (3)**

First semester. Two lectures and one laboratory period per week. Prerequisite, Math. 10, An. Sc. 15 or permission of instructor. A critical study of those factors which influence the nutritional requirements of ruminants, swine and poultry. Practical feeding methods and procedures used in formulation of economically efficient rations will be presented. (Vandersall.)

**AN SC. 116. ANATOMY OF DOMESTIC ANIMALS. (3)**

First semester. One lecture and two laboratory periods per week. A systematic comparative study of the pig, ruminants and fowl, with special emphasis of those systems important in animal production. Prerequisite, Zoology 1. (Brown.)

**AN. SC. 117. INTRODUCTION TO DISEASES OF ANIMALS. (3)**

Second semester. Two lectures and one laboratory period per week. This course gives basic instruction in the nature of disease: including causation, immunity, methods of diagnosis, economic importance, public health aspects and prevention and control of the common diseases of sheep, cattle, swine, horses and poultry. Prerequisite, Micro. 1 and Zoology 1. (Brown.)

**AN. SC. 118. WILDLIFE MANAGEMENT. (3)**

Second semester. Two lectures and one laboratory. An introduction to the interrelationships of game birds and mammals with their environment, population dynamics and the principles of wildlife management. (Flyger.)

**AN. SC. 120. ADVANCED LIVESTOCK JUDGING. (2)**

First semester. Two laboratory periods per week. Prerequisites, An. Sc. 22 and permission of instructor. An advanced course in the selection and judging of purebred and commercial meat animals. The most adept students enrolled in this course are chosen to represent the University of Maryland in Inter-collegiate Livestock judging contests. (Buric.)

**AN. SC. 121. MEATS. (3)**

Second semester. Two lectures and one laboratory period per week. Prerequisite, An. Sc. 20. Registration limited to 14 students. A course designed to give the basic facts about meat as a food and the factors influencing acceptability, marketing, and quality of fresh meats. It includes comparisons of characteristics of live animals with their carcasses, grading and evaluating carcasses as well as wholesale cuts, and the distribution and merchandizing of the nation's meat supply. Laboratory periods are conducted in packing houses, meat distribution centers, and retail outlets. (Buric.)

**AN. SC. 122. LIVESTOCK MANAGEMENT. (3)**

First semester. One lecture and two laboratory periods per week. Prerequisite, Ag. Sc. 109. Application of various phases of animal science to the management and production of beef cattle, sheep and swine. (Foster.)

**AN. SC. 123. LIVESTOCK MANAGEMENT. (3)**

Second semester. One lecture and two laboratory periods per week. Prerequisite, An. Sc. 122. Applications of various phases of animal science to the management and production of beef cattle, sheep and swine. (Leffel.)

## ANIMAL SCIENCE

### AN. SC. 130. PRINCIPLES OF BREEDING. (3)

Second semester. Three lectures per week. Prerequisites, Zoology 6 or Bot. 117. Graduate credit (1-3 hours) allowed with permission of instructor. The practical aspects of animal breeding, heredity, variation, selection, development, systems of breeding and pedigree study are considered. (Green.)

### AN. SC. S131. SPECIAL TOPICS IN ANIMAL SCIENCE. (1)

Prerequisite, permission of instructor. Summer session only. This course is designed primarily for teachers of vocational agriculture and Extension Service personnel. One primary topic, to be selected mutually by the instructor and students, will be presented each session.

### AN. SC. 140. PHYSIOLOGY OF MAMMALIAN REPRODUCTION. (2)

First semester. One lecture and one three-hour laboratory period per week. Prerequisite, Zoology 102 or 104. Anatomy and physiology of the reproductive process and artificial insemination of cattle. (Williams.)

### AN. SC. 141. PHYSIOLOGY OF MILK SECRETION. (2)

Second semester. One lecture and one three-hour laboratory period per week. Prerequisite, Zoology 102 or 104. The anatomy and growth of the mammary gland and the metabolism and physiology of biosynthesis in the ruminant. (Williams.)

### AN. SC. 142. DAIRY CATTLE BREEDING. (3)

Second semester. Two lectures and one laboratory period per week. Prerequisites, An. Sc. 40, Zoology 6 or Bot. 117. A specialized course in breeding dairy cattle. Emphasis is placed on methods of evaluation and selection. systems of breeding and breeding programs. (Plowman.)

### AN. SC. S143. ADVANCED DAIRY PRODUCTION. (1)

Summer session only. An advanced course primarily designed for teachers of vocational agriculture and county agents. It includes a study of the newer discoveries in dairy cattle nutrition, breeding and management.

### AN. SC. 161. POULTRY GENETICS. (3)

Second semester. Prerequisites, An. Sc. 1 and Zoology 6. Two lectures and one laboratory period per week. Inheritance of factors related to egg and meat production and quality are stressed. An experiment utilizing procedures of pedigree matings will be performed in the laboratory. (Wilcox.)

### AN. SC. 162. AVIAN PHYSIOLOGY. (2)

First semester. One three-hour laboratory period per week. Prerequisites. Zoology 102 or 104 and An. Sc. 116. The basic physiology of the bird is discussed, excluding the reproductive system. Special emphasis is given to physiological differences between birds and other vertebrates. (Wilcox.)

### AN. SC. S163. POULTRY BREEDING AND FEEDING. (1)

Summer session only. This course is designed primarily for teachers of vocational agriculture and extension service workers. The first half will be devoted to problems concerning breeding and the development of breeding stock. The second half will be devoted to nutrition. (Combs, Wilcox.)

### AN. SC. S164. POULTRY PRODUCTS AND MARKETING. (1)

Summer session only. This course is designed primarily for teachers of vocational agriculture and county agents. It deals with the factors affecting the

quality of poultry products and with hatchery management problems, egg and poultry grading, preservation problems and market outlets for Maryland poultry. (Helbacka.)

**AN. SC. 165. PHYSIOLOGY OF HATCHABILITY. (1)**

Second semester. One, three-hour laboratory period per week. Prerequisite, Zoology 102 or 104. The physiology of embryonic development as related to principles of hatchability and problems of incubation encountered in the hatchery industry are discussed. (Shaffner.)

**AN. SC. 170. POULTRY HYGIENE. (3)**

Second semester. Two lectures and one laboratory period per week. Prerequisites, Microb. 1 and An. Sc. 1. Virus, bacterial and protozoon diseases; parasitic diseases, prevention, control and eradication. (DeVult.)

**AN. SC. 171. AVIAN ANATOMY. (3)**

First semester. Two lectures and one laboratory per week. Prerequisite, Zoology 1. Gross and microscopic structure, dissection and demonstration. (DeVult.)

**AN. SC. 198. SPECIAL PROBLEMS IN ANIMAL SCIENCE (1-2) (4 cr. max.)**

First and second semester. Prerequisite, approval of staff. Work assigned in proportion to amount of credit. A course designed for advanced undergraduates in which specific problems relating to animal science will be assigned. (Staff.)

**AN. SC. 199. SEMINAR. (1, 1)**

First and second semesters. Prerequisite, permission of staff. Presentation and discussion of current literature and research work in animal science. (Staff.)

*For Graduates*

**AN. SC. 200. ELECTRON MICROSCOPY. (3)**

First and second semesters. One lecture and two laboratory periods per week. Theory of the electron microscope, preparation of specimens, manipulations and photography. (Chang.)

**AN. SC. 220. ADVANCED BREEDING. (2)**

Second semester. Two lectures per week. Prerequisites, An. Sc. 130 or equivalent and Biological Statistics. This course deals with the more technical phases of heredity and variation; selection indices; breeding systems; inheritance in farm animals. (Green.)

**AN. SC. 221. ENERGY AND PROTEIN NUTRITION. (3)**

Second semester. Prerequisites, Chem. 31 and 33, or equivalent, An. Sc. 110, or permission of Instructor. Three lectures per week. A study of animal energetics and the basic descriptions of animals relative to the requirements for energy and protein. Literature dealing with nutrition research techniques and energy and protein utilization and requirements is surveyed. (Leffel, Combs.)

## ANIMAL SCIENCE

### AN. SC. 240. ADVANCED RUMINANT NUTRITION. (3)

First semester. Two, one-hour lectures and one, two-hour laboratory per week. Prerequisite, permission of department. Biochemical physiological and bacteriological aspects of the nutrition of ruminants and other animals.

(Vandersall.)

### AN. SC. 241. RESEARCH METHODS. (3)

First semester. One lecture and two laboratory periods per week. Prerequisite, permission of instructor. The application of biochemical, physio-chemical and statistical methods to problems in biological research.

(Keeney.)

### AN. SC. 242. EXPERIMENTAL MAMMALIAN SURGERY, I. (2)

First semester. Prerequisites, Zool. 102 or 104. Permission of instructor. A course presenting the fundamentals of anesthesia and the art of experimental surgery, especially to obtain research preparation.

(Stewart.)

### AN. SC. 243. EXPERIMENTAL MAMMALIAN SURGERY, II. (3)

Second semester. Prerequisites, An. Sc. 242. Permission of Instructor. A course emphasizing advanced surgical practice to obtain research preparations, cardiovascular surgery and chronic vascularly isolated organ techniques, experience with pump oxygenator systems, profound hypothermia, hemodialysis, infusion systems, implantation and transplantation procedures are taught

(Stewart.)

### AN. SC. 261. PHYSIOLOGY OF REPRODUCTION. (3)

First semester. Two lectures and one laboratory period per week. Prerequisite, Zoology 104 or its equivalent. The role of the endocrines in reproduction is considered. Fertility, sexual maturity, egg formation, ovulation and the physiology of oviposition are studied. Comparative mammalian functions are discussed.

(Shaffner.)

### AN. SC. 262. POULTRY LITERATURE. (1-4)

First and second semesters. Readings on individual topics are assigned. Written reports required. Methods of analysis and presentation of scientific material are discussed.

(Staff.)

### AN. SC. 263. POULTRY NUTRITION LABORATORY. (2)

First semester. One lecture and one laboratory period per week. To acquaint graduate students with common basic nutrition research techniques useful in conducting experiments with poultry. Actual feeding trials with chicks as well as bacteriological and chemical assays will be performed.

(Creek.)

### AN. SC. 264. VITAMINS. (2)

First semester. One lecture and one two-hour lab per week. Prerequisite, Chem. 161. Advanced study of the fundamental role of vitamins in nutrition, including their chemical properties, absorption, metabolism, storage, excretion and deficiency syndromes. A critical study of the biochemical basis of vitamin function, interrelationships of vitamins with other substances, and of certain special laboratory techniques.

(Combs.)

### AN. SC. 265. MINERAL METABOLISM. (2)

Second semester, alternate years (offered 1966). Two lectures per week. Prerequisites, Chem. 161, 163. The role of minerals in metabolism with special emphasis on the needs of man and animals.

(Creek.)

**AN. SC. 301. SPECIAL PROBLEMS IN ANIMAL SCIENCE (1-2) (4 cr. max.)**

First and second semesters. Prerequisite, approval of staff. Work assigned in proportion to amount of credit. Problems will be assigned which relate specifically to the character of work the student is pursuing.

**AN. SC. 302. SEMINAR. (1)**

First and second semester. Students are required to prepare papers, based upon current scientific publications relating to Animal Science, or upon their research work, for presentation before and discussion by the class; (1) Recent advances; (2) Nutrition; (3) Physiology; (4) Biochemistry.

**AN. SC. 399. RESEARCH. (1-12)**

First and second semesters. Work assigned in proportion to amount of credit. Students will be required to pursue original research in some phase of animal science, carrying the same to completion, and report the results in the form of a thesis.

## BOTANY

*Professors:* KRAUSS, BAMFORD, GAUCH, D. T. MORGAN, SISLER AND WEAVER.

*Associate Professors:* BROWN, GALLOWAY, KANTZES, KRUSBERG, LOCKARD, MANS, O. D. MORGAN, PATERSON AND RAPPLEYE.

*Assistant Professors:* KLARMAN, TERBORGH, HARRISON, BEAN, AND PATTERSON.

*Instructor:* EDWARDS.

**BOT. 1. GENERAL BOTANY. (4)**

First and second semesters. Summer session. Two lectures and two laboratory periods a week. Laboratory fee, \$6.00. General introduction to botany, touching briefly on all phases of the subject. Emphasis is on the fundamental biological principles of the higher plants.

**BOT. 2. GENERAL BOTANY. (4)**

Second semester. Two lectures and two laboratory periods a week. Prerequisite, Bot. 1 or equivalent. Laboratory fee, \$6.00. A brief evolutionary study of algae, fungi, liverworts, mosses, ferns and their relatives, and the seed plants, emphasizing their structure, reproduction, habitats, and economic importance.

**BOT. 10. PRINCIPLES OF CONSERVATION. (3)**

First semester. Three lectures per week. A study of the principles of economical use of our natural resources, including water, soil, plants, minerals, wildlife and man.

**BOT. 11. PLANT TAXONOMY. (3)**

Second semester. One lecture and two laboratory periods a week. Prerequisite, Bot. 1, or equivalent. Laboratory fee, \$6.00. An introductory study of plant classification, based on the collection and identification of local plants.

## BOTANY

### BOT. 20. DISEASES OF PLANTS. (4)

First semester. Two lectures and two laboratory periods a week. Prerequisite, Bot. 1, or equivalent. Laboratory fee, \$6.00. An introductory study of the symptoms and causal agents of plant diseases and measures for their control.

#### *For Advanced Undergraduates*

### BOT. 110. PLANT MICROTÉCHNIQUE. (3)

Second semester. One lecture and two laboratory periods a week. Prerequisite, Bot. 1, or equivalent. Laboratory fee, \$6.00. An introductory study of plant classification, based on the collection and identification of local plants. Examinations, including the preparation of temporary and permanent mounts, and photomicrography. (Paterson.)

#### *For Advanced Undergraduates and Graduates*

### BOT. 195. TUTORIAL READINGS IN BOTANY. (HONORS COURSE) (2 or 3)

Prerequisite, admission to the Department of Botany Honors Program. A review of the literature dealing with a specific research problem in preparation for original research to be accomplished in Botany 196. Papers will be assigned and discussed in frequent sessions with the instructor.

### BOT. 196. RESEARCH PROBLEMS IN BOTANY. (HONORS COURSE) (2 or 3)

Prerequisite, Bot. 195. Laboratory fee, \$10.00. The candidate for Honors will pursue a research problem under the direction and close supervision of a member of the faculty.

### BOT. 199. SEMINAR. (1)

First and second semesters. Two semester hours maximum credit. Prerequisite, permission of instructor. Discussion and readings on special topics, current literature, or problems and progress in all phases of botany. Minor experimental work may be pursued if facilities and the qualifications of the students permit. For seniors only, majors and minors in botany or biological science. (Brown.)

## PLANT PHYSIOLOGY

#### *For Advanced Undergraduates and Graduates*

### BOT. 101. PLANT PHYSIOLOGY. (4)

First semester. Two lectures and two laboratory periods a week. Prerequisites, Botany 1, General Chemistry, Organic Chemistry or the consent of the instructor. Laboratory fee, \$6.00. A survey of the general physiological activities of plants. (Krauss.)

### BOT. 102. PLANT ECOLOGY. (2)

Second semester. Prerequisite, Bot. 1. A study of the different plant successions and vegetational climaxes and their correlation with the climatic, soil, and biotic factors of the environment. (Brown.)

### BOT. 103. PLANT ECOLOGY LABORATORY. (1)

Prerequisite, Bot. 102 or its equivalent or concurrent enrollment therein. One three-hour laboratory period a week. Laboratory fee, \$6.00. The application of field and other methods to these qualitative and quantitative study of vegetation and environmental factors. (Brown.)

**BOT. 200. PLANT BIOCHEMISTRY. (2)**

First semester. (Not offered 1967-68.) Prerequisites, Bot. 101 and elementary organic chemistry, or equivalent. A study of the important substances in the composition of the plant body and the chemical changes occurring therein. (Galloway.)

**BOT. 201. PLANT BIOCHEMISTRY LABORATORY. (2)**

First semester. (Not offered 1967-68.) Two laboratory periods a week. Prerequisite, Bot. 200 or concurrent registration therein. Laboratory fee, \$10.00. Application of apparatus and techniques to the study of the chemistry of plant materials. (Galloway, Gauch.)

**BOT. 202. PLANT BIOPHYSICS. (2)**

Second semester. (Not offered 1966-67.) Prerequisite, Bot. 101 and introductory physics, or equivalent. An advanced course dealing with the operation of physical phenomena in plant life processes. (Galloway.)

**BOT. 203. BIOPHYSICAL METHODS. (2)**

Second semester. (Not offered 1966-67.) Two laboratory periods a week. Laboratory course to accompany Bot. 202. Laboratory fee, \$10.00. (Galloway, Gauch.)

**BOT. 204. GROWTH AND DEVELOPMENT. (2)**

First semester. (Not offered 1966-67.) Prerequisite, 12 semester hours of plant science. A study of current developments in the mathematical treatment of growth and the effects of radiation, plant hormones, photoperiodism, and internal biochemical balance during the development of the plant. (Krauss.)

**BOT. 205. MINERAL NUTRITION OF PLANTS. (2)**

Second semester. (Not offered 1967-68.) Reports on current literature are presented and discussed in connection with recent advances in the mineral nutrition of plants. (Paterson.)

**BOT. 209. PHYSIOLOGY OF ALGAE. (2)**

Second semester. (Not offered 1967-1968.) Prerequisite, Bot. 201, the equivalent in allied fields, or permission of the instructor. A study of the physiology and comparative biochemistry of the algae. Laboratory techniques and recent advances in algal nutrition, photosynthesis, and growth will be reviewed. (Krauss.)

**BOT. 210. PHYSIOLOGY OF ALGAE-LABORATORY. (1)**

Second semester. (Not offered 1967-1968.) One laboratory period a week. Prerequisites, previous or concurrent enrollment in Bot. 209, and permission of instructor. Laboratory fee, \$10.00. Special laboratory techniques involved in the study of algal nutrition. (Krauss.)

**BOT. 219. ADVANCED PLANT ECOLOGY. (2)**

Fall semester. (Not offered 1967-68.) Prerequisite, Bot. 102 or equivalent and permission of instructor. Discussion of current developments in ecology, with emphasis on quantitative and radioecological techniques and the energy exchanges in ecological systems. Field trips and problems will be arranged. Lab fee, \$10.00. (Brown, Terborgh.)

## BOTANY

### PLANT MORPHOLOGY, CYTOLOGY AND TAXONOMY

#### *For Advanced Undergraduates and Graduates*

#### BOT. 111. PLANT ANATOMY. (3)

First semester. One lecture and two laboratory periods a week. Prerequisite, Bot. 110, or equivalent. Laboratory fee, \$5.00. The origin and development of the organs and tissue systems in the vascular plants. (Rappleye.)

#### BOT. 113. PLANT GEOGRAPHY. (2)

First semester. Prerequisite, Bot. 1, or equivalent. A study of plant distribution throughout the world and the factors generally associated with such distribution. (Brown.)

#### BOT. 115. STRUCTURE OF ECONOMIC PLANTS. (3)

Second semester. (Not offered 1967-68.) One lecture and two laboratory periods a week. Prerequisite, Bot. 111. Laboratory fee, \$5.00. A detailed microscopic study of the anatomy of the chief fruit and vegetable crops. (Rappleye.)

#### BOT. 116. HISTORY AND PHILOSOPHY OF BOTANY. (1)

Second semester. (Not offered 1966-67.) Prerequisites, 20 semester hours credit in biological sciences, including Bot. 1 or equivalent. Discussion of the development and ideas and knowledge about plants, leading to a survey of contemporary work in botanical science. (Bamford.)

#### BOT. 117. GENERAL PLANT GENETICS. (2)

Second semester. Prerequisite, Bot. 1 or equivalent. The basic principles of plant genetics are presented; the mechanics of transmission of the hereditary factors in relation to the life cycle of seed plants, the genetics of specialized organs and tissues, spontaneous and induced mutations of basic and economic significance, gene action, genetic maps, the fundamentals of polyploidy, and genetics in relation to methods of plant breeding are the topics considered. (Mans, D. T. Morgan.)

#### BOT. 136. PLANTS AND MANKIND. (2)

First semester. Prerequisite, Bot. 1 or equivalent. A survey of the plants which are utilized by man, the diversity of such utilization, and their historic and economic significance. (Rappleye.)

#### BOT. 151S. TEACHING METHODS IN BOTANY. (2)

Summer session. Four two-hour laboratory demonstration periods per week for eight weeks. Prerequisite, Bot. 1, or equivalent. Laboratory fee, \$5.00. A study of the biological principles of common plants, and demonstrations, projects, and visual aids suitable for teaching in primary and secondary schools. (Lockard.)

#### BOT. 153. FIELD BOTANY AND TAXONOMY. (2)

Summer session. Prerequisite, Bot. 1 or General Biology. Four two-hour laboratory periods a week for eight weeks. Laboratory fee, \$5.00. The identification of trees, shrubs, and herbs, emphasizing the native plants of Maryland. Manuals, keys, and other techniques will be used. Numerous short field trips will be taken. Each student will make an individual collection. (Brown.)

**BOT. 161. SYSTEMATIC BOTANY. (2)**

Fall semester. (Not offered 1966-67.) Two two-hour laboratory periods a week. Prerequisite, Bot. 11 or equivalent. An advanced study of the principles of systematic botany. Laboratory practice with difficult plant families including grasses, sedges, legumes, and composites. Field trips arranged. Lab Fee \$6.00. (Brown.)

*For Graduates***BOT. 211. CYTOLOGY. (4)**

First semester. (Not offered 1967-68.) Two lectures and two laboratory periods a week. Prerequisite, introductory genetics. Laboratory fee, \$10.00. A detailed study of the chromosomes in mitosis and meiosis, and the relation of these to current theories of heredity and evolution.

(Bamford, D. T. Morgan.)

**BOT. 212. PLANT MORPHOLOGY. (3)**

Second semester. One lecture and two laboratory periods a week. Prerequisites, Bot. 11, Bot. 111, or equivalent. Laboratory fee, \$5.00. A comparative study of the morphology of the flowering plants, with special reference to the phylogeny and development of floral organs. (Rappleye.)

**BOT. 215. PLANT CYTOGENETICS. (3)**

First semester. (Not offered 1966-67.) Two lectures and one laboratory period a week. Prerequisite, introductory genetics. Laboratory fee, \$10.00. An advanced study of the current status of plant genetics, particularly gene mutations and their relation to chromosome changes in corn and other favorable materials. (D. T. Morgan, Mans.)

**PLANT PATHOLOGY***For Advanced Undergraduates and Graduates***BOT. 122. RESEARCH METHODS IN PLANT PATHOLOGY. (2)**

First semester. Two laboratory periods a week. Prerequisite, Bot. 20, or equivalent. Laboratory fee, \$5.00. Advanced training in the basic research techniques and methods of plant pathology. (Klarman.)

**BOT. 123. DISEASES OF ORNAMENTAL PLANTS. (2)**

Second semester. (Not offered 1966-67.) Prerequisite, Bot. 20, or equivalent. Symptoms, control measures, and other pertinent information concerning the diseases which affect important ornamental plants grown in the eastern states. (Klarman.)

**BOT. 124. DISEASES OF TOBACCO AND AGRONOMIC CROPS. (2)**

First semester. (Not offered 1967-68.) Prerequisite, Bot. 20, or equivalent. The symptoms and control of the diseases of tobacco, forage crops and cereal grains. (O. D. Morgan.)

## BOTANY

### BOT. 125. DISEASES OF FRUIT CROPS. (2)

First semester. (Not offered 1966-67.) Prerequisite, Bot. 20, or equivalent. Symptoms and control of the diseases affecting fruit production in the eastern United States. (Weaver.)

### BOT. 126. DISEASES OF VEGETABLE CROPS. (2)

Second semester. (Not offered 1967-68.) Prerequisite, Bot. 20, or equivalent. The recognition and control of diseases affecting the production of important vegetable crops grown in the eastern United States. (Kantzes.)

### BOT. 128. MYCOLOGY. (4)

Second semester. (Not offered 1967-68.) Laboratory fee, \$6.00. An introductory study of the morphology, classification, life histories, and economics of the fungi. (Paterson.)

### BOT. 152S. FIELD PLANT PATHOLOGY. (1)

Summer session. Daily lecture for three weeks. Prerequisite, Bot. 20, or equivalent. Given in accordance with demand. Laboratory fee, \$5.00. (Not offered 1964.) A course for county agents and teachers of vocational agriculture. Discussion and denomination of the important diseases in Maryland crops.

## *For Graduates*

### BOT. 221. PLANT VIROLOGY. (3)

First semester. (Not offered 1967-68.) Two lectures and one laboratory period a week. Prerequisites, Bot. 20 and Bot. 101 or equivalent. Laboratory fee, \$10.00. Consideration of the biological, biochemical and biophysical aspects of plant viruses and virus diseases. (Sisler.)

### BOT. 223. PHYSIOLOGY OF FUNGI. (2)

First semester. (Not offered 1967-1968.) Prerequisites, Organic Chemistry and Bot. 101 or the equivalent in bacterial or animal physiology. A study of various aspects of fungal metabolism, nutrition, biochemical transformations, fungal products, and mechanism of fungicidal action. (Sisler.)

### BOT. 224. PHYSIOLOGY OF FUNGI LABORATORY. (1)

First semester. (Not offered 1967-1968.) One laboratory period per week. Prerequisite, Bot. 223 or concurrent registration therein. Laboratory fee, \$10.00. Application of equipment and techniques in the study of fungal physiology. (Sisler.)

### BOT. 226. PLANT DISEASE CONTROL. (3)

First semester. (Not offered 1966-67.) Prerequisite, Bot. 20, or equivalent. An advanced course dealing with the theory and practices of plant disease control. (Staff.)

### BOT. 241. PLANT NEMATOLOGY. (4)

Second semester. Two lectures and two laboratory periods a week. Prerequisite, Botany 20 or permission of instructor. (Not offered 1966-67.) Laboratory fee, \$10.00. The study of plant-parasitic nematodes, their morphology, anatomy, taxonomy, genetics, physiology, ecology, host-parasite relations and control. Recent advances in this field will be emphasized. (Krusberg.)

**BOT. 301. SPECIAL PROBLEMS IN BOTANY. (1 to 3)**

First and second semester. Credit according to time scheduled and organization of course. Maximum credit toward an advanced degree for the individual student at the discretion of the Department. This course may be organized as a lecture series on a specialized advanced topic, or may consist partly, or entirely, of experimental procedures. It may be taught by visiting lecturers, or by resident staff members. Problems or topics may be in: 1—Physiology; 2—Ecology; 3—Pathology; 4—Mycology; 5—Nematology; 6—Cytology; 7—Cytogenetics; 8—Morphology; 9—Anatomy; or 10—Taxonomy. (Staff.)

**BOT. 302. SEMINAR IN BOTANY. (1)**

First and second semesters. Prerequisite, permission of the instructor. Discussion of special topics and current literature in all phases of botany. (Staff.)

**BOT. 399. RESEARCH.**

Credit according to work done. A minimum of 6 credit hours is required for the M. S. degree, and an additional minimum of 12 hours is required for the Ph.D. degree. Students must be qualified to pursue with profit the research to be undertaken. (Staff.)

## ENTOMOLOGY

*Professors:* BICKLEY AND JONES.

*Associate Professors:* HARRISON AND MESSERSMITH.

*Lecturer:* HAVILAND.

**ENT. 1. INTRODUCTORY ENTOMOLOGY. (3)**

First and second semesters. Two lectures and one laboratory period a week. Prerequisite, one semester of college zoology. Laboratory fee, \$3.00. The position of insects in the animal kingdom, their gross structure, classification into orders and principal families and the general economic status of insects. A collection of common insects is required.

**ENT. 4. BEEKEEPING. (2)**

First semester. A study of the life history, behavior and seasonal activities of the honeybee, its place in pollination of flowers with emphasis on plants of economic importance and bee lore in literature.

**ENT. 20. INSECT PESTS OF AGRICULTURAL CROPS. (4)**

First semester. Two lectures and two two-hour laboratory periods a week. Prerequisites, Zool. 1 and Bot. 1. Laboratory fee, \$3.00. The recognition, biology, and control of insects injurious to fruit and vegetable crops, field crops and stored products.

**ENT. 100. ADVANCED APICULTURE. (3)**

Second semester. One lecture and two three-hour laboratory periods a week. Prerequisite, Ent. 4. Laboratory fee, \$3.00. The theory and practice of apiary management. Designed for the student who wishes to keep bees or requires a practical knowledge of bee management.

## ENTOMOLOGY

### ENT. 105. MEDICAL ENTOMOLOGY. (3)

First semester. Two lectures and one two-hour laboratory period a week. Prerequisite, Ent. 1 or consent of the Department. Laboratory fee, \$3.00. A study of insects and related arthropods that affect the health and comfort of man directly and as vectors of disease. In discussion of the control of such pests the emphasis will be upon community sanitation. (Messersmith.)

### ENT. 116. INSECT PESTS OF ORNAMENTALS AND GREENHOUSE PLANTS. (3)

Second semester. Two lectures and one two-hour laboratory period a week. Prerequisites, Bot. 1 and Zool. 1. Laboratory fee, \$3.00. The recognition, biology, and control of insects injurious to plants grown in ornamental plantings, nurseries, and under glass. (Haviland.)

### ENT. 119. INSECT PESTS OF DOMESTIC ANIMALS. (2)

First semester. One lecture and one two-hour laboratory period a week. Prerequisite Ent. 1, or consent of the Department. Laboratory fee, \$3.00. The recognition, biology, and control of insects and related arthropods injurious to horses, cattle, hogs, sheep, goats, and poultry.

### ENT. 120. INSECT TAXONOMY AND BIOLOGY. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, Ent. 1. Laboratory fee, \$3.00. Introduction to the principles of systematic entomology and the study of all orders and the important families of insects; immature forms considered. (Bickley.)

### ENT. S121. ENTOMOLOGY FOR SCIENCE TEACHERS. (4)

Summer. Five lectures and five two-hour laboratory periods a week. Laboratory fee, \$3.00. This course will include the elements of morphology, taxonomy and biology of insects using examples commonly available to high school teachers. It will include practice in collecting, preserving, rearing and experimenting with insects insofar as time will permit.

### ENT. 122. INSECT MORPHOLOGY. (4)

First semester. (Not offered 1966-67.) Two lectures and two three-hour laboratory periods a week. Laboratory fee, \$3.00. Prerequisite, Ent. 1. A basic study of insect form, structure and organization in relation to function.

### <sup>4</sup>ENT. 123. INSECT PHYSIOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Laboratory fee, \$15.00. Prerequisites, Ent. 1, Chem. 31 or equivalent. Lectures and laboratory exercises on the cuticle, growth, endocrines, muscles, circulation, nerves, digestion, excretion and reproduction in insects. (Jones.)

### ENT. 198. SPECIAL PROBLEMS. (1-3)

First and second semesters. Credit and prerequisites, to be determined by the Department. Investigations of assigned entomological problems. (Staff.)

### ENT. 199. SEMINAR. (1, 1)

First and second semesters. Prerequisite, senior standing. Presentation of original work, reviews and abstracts of literature. (Staff.)

<sup>4</sup>Effective 1967-68.

*For Graduates***ENT. 205. INSECT ECOLOGY. (2)**

Second semester. One lecture and one two-hour laboratory period a week. Prerequisite, consent of the Department. Laboratory fee, \$3.00. A study of fundamental factors involved in the relationship of insects to their environment. Emphasis is placed on the insect as a dynamic organism adjusted to its surroundings. (Harrison.)

**ENT. 206. CULICIDOLOGY. (2)**

Second semester, alternate years. One lecture and one three-hour laboratory period a week. Laboratory fee, \$3.00. The classification, distribution, ecology, biology, and control of mosquitoes. (Bickley.)

**ENT. 208. TOXICOLOGY OF INSECTICIDES. (3)**

First semester, alternate years. Three lectures and one three-hour laboratory period a week. Lab fee, \$15.00. Prerequisite, Chem. 31 or permission of instructor. A study of the physical, chemical and biological properties of insecticides. Emphasis is placed on the relationship of chemical structure to insecticidal activity and mode of action. Mechanisms of resistance are also considered. (Staff.)

**ENT. 209. ADVANCES IN INSECT PHYSIOLOGY. (2)**

First semester, alternate years. Two lectures a week. Prerequisites, Ent. 123 or consent of instructor. Lectures on current literature with reading assignments and discussion. (Jones.)

**ENT. 210. ENTOMOLOGICAL TOPICS. (Credit arranged)**

First and second semesters. One lecture or one two-hour laboratory a week for each credit hour. Prerequisite, consent of Department. Lectures, group discussions or laboratory sessions on selected topics such as: Aquatic Insects, Biological Control of Insects, Entomological Literature, Forest Entomology, History of Entomology, Insect Biochemistry, Insect Embryology, Immature Insects, Insect Behavior, Principles of Economic Entomology, Insect Communication, Principles of Entomological Research. (Staff and visiting lecturers.)

**ENT. 301. ADVANCED ENTOMOLOGY. (1-6)**

Credit and prerequisites to be determined by the Department. First and second semesters. Studies of minor problems in morphology, taxonomy and applied entomology, with particular reference to the preparation of the student for individual research. (Staff.)

**ENT. 399. RESEARCH.**

First and second semesters. Required of graduate students majoring in entomology. This course involves research on an approved project. A dissertation suitable for publication must be submitted at the conclusion of the studies as a part of the requirement for an advanced degree. (Staff.)

## FOOD SCIENCE

*Professors:* FOSTER (Animal Science)

DAVIS, ARBUCKLE AND KEENEY (Dairy Science)

STARK<sup>5</sup> AND KRAMER (Horticulture)

SHAFFNER (Poultry Science)

*Associate Professors:* BURIC (Animal Science)

KING AND MATTICK (Dairy Science)

WILEY (Horticulture)

HELBACKA (Poultry Science)

*Assistant Professor:* KATZ (Dairy Science)

### FD. SC. 1. INTRODUCTION TO FOOD SCIENCE. (3)

Second semester. Two lectures and one laboratory per week. An introductory course to orient the student in the broad field of food science. Includes a historical and economic survey of the major food industries, composition and nutritive value, quality aspects, spoilage, preservation, sanitation, standards and regulation of foods. (Mattick.)

#### *For Advanced Undergraduates and Graduates*

### FD. SC. 102. PRINCIPLES OF FOOD PROCESSING—I. (3)

Second semester. Two lectures and one laboratory per week. A study of the basic methods by which foods are preserved (unit operations). Effect of raw product quality and the various types of processes on yield and quality of the preserved products. (Wiley.)

### FD. SC. 103. PRINCIPLES OF FOOD PROCESSING—II. (3)

First semester. Three lectures per week. A detailed study of food processing with emphasis on line and staff operations, including physical facilities, utilities, pre- and post-processing operations, processing line development and sanitation. (Mattick.)

### FD. SC. 111. FOOD CHEMISTRY. (3)

First semester. Two lectures and one laboratory per week. Prerequisites, organic chemistry. The application of basic chemical and physical concepts to the composition and properties of foods. Emphasis will be on the relationship of processing technology on the keeping quality, nutritional value and acceptability of foods. (King.)

### FD. SC. 112. ANALYTICAL QUALITY CONTROL. (3)

Second semester. Two lectures and one laboratory per week. Instrumental and sensory measurement of food quality attributes including appearance, rheological, flavor, and microbiological evaluations, and their integration into grades and standards of quality. (Kramer.)

---

<sup>5</sup>Chairman of Curriculum.

**FD. SC. 113. STATISTICAL QUALITY CONTROL. (3)**

First semester. Two lectures and one laboratory per week. Statistical methods for acceptance sampling of supplies and raw materials, in-plant and finished product inspection, water, fuel, and waste control, production, transportation, inventory and budget controls. (Kramer.)

**FD. SC. 125. MEAT AND MEAT PROCESSING. (3)**

First semester. Two lectures and one laboratory per week. Physical and chemical characteristics of meat and meat products, meat processing, methods of testing and product development.

**FD. SC. 131. FOOD PRODUCT RESEARCH AND DEVELOPMENT. (3)**

Second semester. Two lectures, one laboratory per week. A study of the research and development function for improvement of existing products and development of new, economically feasible and marketable food products. Application of chemical-physical characteristics of ingredients to produce optimum quality products, cost reduction, consumer evaluation, equipment and package development. (Staff.)

**FD. SC. 156. HORTICULTURAL PRODUCTS PROCESSING. (3)**

First semester. Two lectures and one laboratory per week. Laboratory fee \$5.00. Commercial methods of canning, freezing, dehydrating, fermenting, and chemical preservation of fruit and vegetable crops. (Wiley.)

**FD. SC. 160. TECHNOLOGY OF MARKET EGGS AND POULTRY. (3)**

First semester. Two lectures and one laboratory per week. A study of the technological factors concerned with the processing, storage, and marketing of eggs and poultry and the factors affecting their quality. (Helbacka.)

**FD. SC. 182. DAIRY PRODUCTS PROCESSING. (3)**

Second semester. Two lectures and one laboratory per week. Method of production of fluid milk, butter, cheese, condensed and evaporated milk and milk products and ice cream. (Mattick.)

**FD. SC. 198. SPECIAL PROBLEMS IN FOOD SCIENCE. (2, 2) (4 cr. max.)**

First and second semesters. Prerequisite, approval of staff. Designed for advanced undergraduates in which specific problems in food science will be assigned. (Staff.)

**FD. SC. 199. SEMINAR. (1, 1)**

First and second semesters. Presentation and discussion of current literature and research in food science. (Staff.)

**MECHANICS OF FOOD PROCESSING**

See Agricultural Engineering, Agr. Eng. 113.

**EXPERIMENTAL FOOD SCIENCE**

See Food and Nutrition, Food 153.

*For Graduates*

See course offerings in Animal Science and in Horticulture.

## HORTICULTURE

## HORTICULTURE

*Professors:* STARK, HAUT, KRAMER, LINK, REYNOLDS, SCOTT, SHANKS AND THOMPSON.

*Associate Professors:* WILEY AND SNYDER.

*Assistant Professors:* ANGELL, BAKER AND SOERGEL.

### HORT. 5. TREE FRUIT PRODUCTION. (3)

First semester. Prerequisite Bot. 1. Two lectures and one laboratory per week. A detailed study of the principles and practices in fruit production, harvesting, and storage, with emphasis on the apple. One field trip required. (Thompson.)

### HORT. 6. TREE FRUIT PRODUCTION. (2)

Second semester. (Offered 1967-68.) Two lectures per week. Prerequisite Hort. 5. A study of the principles and practices in fruit production, harvesting, and handling of deciduous tree fruit crops other than the apple. (Thompson.)

### HORT. 11. GREENHOUSE MANAGEMENT. (3)

First semester. Three lectures per week. Prerequisite Bot. 1. A study of the construction and operation of structures for forcing horticultural crops and the principles underlying the regulation of plant growth under greenhouse conditions. (Shanks.)

### HORT. 12. GREENHOUSE MANAGEMENT LABORATORY. (1)

First semester. One two-hour laboratory per week. Prerequisite or concurrent Hort. 11. Demonstration and application of practices in the commercial production of greenhouse crops. (Shanks.)

### HORT. 16. GARDEN MANAGEMENT. (3)

Second semester. Two lectures per week. Prerequisite Bot. 1. The planting and care of ornamental plants on the home grounds and a study of commonly used species of annuals and herbaceous perennials. (Link.)

### HORT. 17. FLOWER PRODUCTION LABORATORY. (1)

Second semester. One two-hour laboratory per week. Prerequisite or concurrent Hort. 11 or 16. Demonstration and application of practices in the production of garden and greenhouse plants. (Link.)

### HORT. 20. INTRODUCTION TO THE ART OF LANDSCAPING. (3)

First and second semesters. Three lectures per week. The theory and general principles of landscape design with their application to public and private areas. (Soergel.)

### HORT. 30. ELEMENTS OF FORESTRY. (3)

Second semester, alternate years. (Offered 1967-68.) Two lectures and one laboratory period per week. Prerequisite Bot. 1. Not open to freshmen. A general survey of the field of forestry, including timber values, conservation, protection, silviculture, utilization, mensuration, engineering, recreation and lumbering. Principles and practices of woodland management.

**HORT. 56. BASIC LANDSCAPE COMPOSITION. (2)**

First and second semesters. Two laboratory periods per week. The introduction of landscaping presentation technique, supplemented by problems in basic composition. (Soergel.)

**HORT. 58. VEGETABLE PRODUCTION. (3)**

Second semester. Two lectures and one laboratory period a week. Prerequisite, Bot. 1. A study of the principles and practices of commercial vegetable production. (Reynolds.)

**HORT. 59. BERRY PRODUCTION. (3)**

Second semester. Two lectures and one laboratory period a week. Prerequisite, Bot. 1. A study of the principles and practices involved in the production of small fruits including grapes, strawberries, raspberries, blackberries, and cranberries. (Angell.)

**HORT. 62. PLANT PROPAGATION. (3)**

First semester. Three lectures per week. Prerequisite Bot. 1. A study of the principles and practices of the propagation of plants. (Baker.)

**HORT. 63. FLOWER STORE MANAGEMENT. (3)**

Second semester, alternate years. (Offered 1966-67.) Two lectures and laboratory periods a week. Prerequisite, Hort. 11. Laboratory fee, \$5.00. A study of the operation and management of a flower store. Laboratory period devoted to principles and practice of floral arrangements and decoration. (Link.)

*For Advanced Undergraduates*

**HORT. 100. PRINCIPLES OF LANDSCAPE DESIGN. (3)**

First semester. One lecture and two laboratory periods per week. Prerequisite Hort. 20 and Hort. 56. A consideration of design criteria and procedure as applied to residential properties. (Soergel.)

**HORT. 152. ADVANCED LANDSCAPE DESIGN. (3)**

Second semester, alternate years. (Offered 1966-67.) One lecture and two laboratory periods per week. Prerequisite Hort. 100, prerequisite or concurrent Hort. 108. The design of public and private areas with the major emphasis on plant materials. (Soergel.)

**HORT. 153. LANDSCAPE CONSTRUCTION. (3)**

Second semester, alternate years. (Offered 1967-68.) One lecture and two laboratory periods per week. Prerequisite Hort. 100. An introductory study and application of location methods, construction details, and construction techniques of the various landscape objects such as walks, walls, benches, roads. (Soergel.)

**HORT. 199. SEMINAR. (1)**

Second semester. Oral presentation of the results of investigational work by reviewing recent scientific literature in the various phases of horticulture. (Staff.)

## HORTICULTURE

### *For Advanced Undergraduates and Graduates*

#### HORT. 101. TECHNOLOGY OF FRUITS. (3)

First semester. (Offered 1966-67.) Three lectures per week. Prerequisite Hort. 6; prerequisite or concurrent Bot. 101. A critical analysis of research work and application of the principles of plant physiology, chemistry, and botany to practical problems in commercial production. (Thompson.)

#### HORT. 103. TECHNOLOGY OF VEGETABLES. (3)

Second semester. (Offered 1967-68.) Three lectures per week. Prerequisite Hort. 58; prerequisite or concurrent Bot. 101. A critical analysis of research work and application of the principles of plant physiology, chemistry, and botany to practical problems of commercial vegetable production. (Reynolds.)

#### HORT. 105. TECHNOLOGY OF ORNAMENTALS. (2)

First semester. Three lectures per week. Prerequisite or concurrent Bot. 101. A study of the physiological processes of the plant as related to the growth, flowering and storage of ornamental plants. (Link.)

#### HORT. 107, 108. WOODY PLANT MATERIALS. (3, 3)

First and second semesters. Prerequisite, Bot. 11. A field and laboratory study of trees, shrubs, and vines used in ornamental plantings. (Baker.)

#### HORT. 114. SYSTEMATIC HORTICULTURE. (3)

First semester. Two lectures and one laboratory period a week. A study of the origin, taxonomic relationship and horticultural classification of fruits and vegetables. (Angell.)

#### HORT. S115. TRUCK CROP MANAGEMENT. (1)

Summer session only. Primarily designed for teachers of vocational agriculture and extension agents. Special emphasis will be placed upon new and improved methods of production of the leading truck crops. Current problems and their solution will receive special attention.

#### HORT. S124. TREE AND SMALL FRUIT MANAGEMENT. (1)

Summer session only. Primarily designed for vocational agriculture teachers and county agents. Special emphasis will be placed upon new and improved commercial methods of production of the leading tree and small fruit crops. Current problems and their solution will receive special attention.

#### HORT. S125. ORNAMENTAL HORTICULTURE. (1)

Summer session only. A course designed for teachers of agriculture and extension agents to place special emphasis on problems of the culture and use of ornamental plants.

#### HORT. 161. PHYSIOLOGY OF MATURATION AND STORAGE OF HORTICULTURAL CROPS. (2)

Second semester, alternate years. (Offered 1966-67.) Two lectures a week. Prerequisite, Bot. 101. Factors related to maturation and application of scientific principles to handling and storage of horticultural crops. (Scott.)

#### HORT. 162. FUNDAMENTALS OF GREENHOUSE CROP PRODUCTION. (3)

Second semester. Three lectures per week. Prerequisite Hort. 11. This course deals with a study of the commercial production and marketing of ornamental plant crops under greenhouse, plastic houses and out-of-door conditions. (Shanks.)

## HORTICULTURE

### HORT. 163. PRODUCTION AND MAINTENANCE OF WOODY PLANTS. (3)

Second semester, alternate years. (Offered 1967-68). Two lectures and one laboratory period a week. Prerequisite or concurrent Hort. 62; 108. A study of the production methods and operation of a commercial nursery and the planting and care of woody plants in the landscape. (Link.)

### HORT. 198. SPECIAL PROBLEMS. (2, 2) (4 cr. max.)

First and second semesters. Credit arranged according to work done. For major students in horticulture or botany. Four credits maximum per student. (Staff.)

Also see Food Science 102, 112, 113, 156

### *For Graduates*

### HORT. 201, 202. EXPERIMENTAL POMOLOGY. (3, 3)

First and second semesters. Prerequisite, Bot. 101. A systematic review of scientific knowledge and practical observations as applied to commercial practices in pomology. (Thompson.)

### HORT. 203, 204, 205. EXPERIMENTAL OLERICULTURE. (2, 2, 2)

First semester and in sequence. Prerequisite, Bot. 101, a systematic review of scientific knowledge and practical observation as applied to commercial practices in olericulture. (Reynolds, Snyder.)

### HORT. 206. EXPERIMENTAL FLORICULTURE. (3)

First semester. Prerequisite, Bot. 101. A systematic review of scientific knowledge and practical observation as applied to commercial practices in floriculture. (Link.)

### HORT. 207. METHODS OF HORTICULTURAL RESEARCH. (3)

Second semester. One lecture and one four-hour laboratory period a week. A critical study of research methods which are or may be used in horticulture. (Scott.)

### HORT. 210. EXPERIMENTAL PROCESSING. (2)

Second semester. Prerequisite, permission of instructor. A systematic review of scientific knowledge and practical observations as applied to commercial practices in processing. (Kramer.)

### HORT. 302. ADVANCED SEMINAR. (1, 1)

First and second semesters. Oral reports with illustrative material are required on special topics or recent research publications in horticulture. Three credit hours maximum allowed toward the M.S. degree or six credits maximum toward the Ph.D. degree. (Staff.)

### HORT. 399. ADVANCED HORTICULTURAL RESEARCH. (2-12)

First and second semesters. Credit granted according to work done. (Staff.)

## THE AGRICULTURAL EXPERIMENT STATION

IRVIN C. HAUT, Ph.D., *Director*

The Agricultural Experiment Station serves Maryland agriculture in much the same manner as research laboratories serve large corporations. Maryland agriculture comprises over thirty thousand individual businesses, and there is neither sufficient capital, nor income so that each one of these can conduct research. Yet the problems which face a biological undertaking such as farming, are as numerous and perplexing as the problems of any business. Certainly our production of food would be much more costly if it were not for the research results that have been obtained by the Agricultural Experiment Station.

The station is a joint federal and state undertaking. Passage of the Hatch Act of 1887, which made available a grant in aid to each state for the purpose of establishing an agricultural experiment station, gave a great impetus to the development of research work in agriculture. This work was further encouraged by the passage of the Adams Act in 1906, the Purnell Act in 1925, the Bankhead-Jones Act in 1935, and the Flannagan-Hope Act of 1946.

The work of the Maryland Agricultural Experiment Station, which is supported by these Acts and by State appropriations, centers at College Park. On the University campus are laboratories for studying insects and diseases, soil fertility, botanical problems, and others. This is also the location of the livestock and dairy barns with their experimental herds. About eight miles from the campus at College Park, near Beltsville, the Plant Research Farm of about 500 acres is devoted to work connected with soil fertility, plant breeding and general crop production problems. An experimental farm near Upper Marlboro is devoted to the problems of tobacco growing and curing. A farm near Salisbury is devoted to solution of the problems of producers of broilers and of vegetable crops in the southern Eastern Shore area. Two experimental farms are operated near Ellicott City; one is devoted to livestock problems and the other to dairy cattle nutrition and forage research. Also tests of various crop and soil responses are distributed throughout the state. These different locations provide the opportunity to conduct experiments under conditions existing where the results will be put into practice. The solution of many difficult problems in the past has given the Station an excellent standing with farmers of the state.

## AGRICULTURAL EXTENSION SERVICE

EDWARD W. AITON, *Director*

ROY W. CASSELL, *Assistant Director*

Cooperative Extension work in agriculture and home economics, established by state and federal laws in 1914, extends practical agricultural and home information beyond the classrooms of the University of Maryland to young people, farmers, homemakers, and people in businesses relating to agriculture and home economics.

The educational endeavors of the Cooperative Extension Service are financed cooperatively by the federal, state, and county governments. In each county there is a competent staff of Extension agents assigned to conduct educational work in rather specific program areas consistent with the needs of the people in the county and as funds permit. The county staff is supported by a staff of specialists located at the University, and through their mutual efforts they assist local people in seeking solutions to problems.

This work is conducted under a Memorandum of Understanding between the Cooperative Extension Service of the University and the United States Department of Agriculture. The Maryland Cooperative Extension Service functions as the educational arm of the United States Department of Agriculture and the University of Maryland.

The Cooperative Extension Service works in close harmony and association with all rural groups and organizations. In addition to the work on the farms and in the farm homes, the Extension program is aimed at the many rural, non-farm, and urban clientele who service the agricultural industries of the state including consumers.

In addition to work with adults, thousands of boys and girls gain leadership knowledge and experience and are provided practical educational instruction in 4-H Clubs and other youth groups. Through the many diversified activities, the boys and girls gain valuable experience from instruction and training and are afforded an opportunity to develop self-confidence, perseverance, and citizenship.

The Cooperative Extension Service in cooperation with the College of Agriculture and the Experiment Station arranges and conducts short courses, workshops, and conferences in various lines, many of which are held at the University. Some of these activities have been held regularly over a period of years and others are added as the need and demand develop. Short courses have been held in recent years for the following groups: rural women, 4-H Club boys and girls, nurserymen, florists, poultry industry fieldmen, poultry products marketing, beekeepers, greenkeepers, sanitarians, conservation, dairy herd improvement supervisors, feed manufacturers and distributors, and dairy marketing technicians.

## SERVICE AND CONTROL PROGRAMS

CHARLES P. ELLINGTON, *Director*

The state law provides that the Board of Regents of the University of Maryland shall constitute the Maryland State Board of Agriculture. While the Service and Control programs are part of the University, they are designed primarily to carry out the functions of the State Board of Agriculture. Numerous services are performed which result in the improvement and maintenance of high standards in production, processing and distribution of farm products. In addition, many control or regulatory activities are authorized by state law and are carried out by the following departments of the State Board of Agriculture:

### DAIRY INSPECTION

The Maryland law relating to the weighing, sampling, and testing of milk became effective June 1, 1965.

The purposes of the law are: (a) To insure producers who sell milk that samples, weights, and tests used as the basis of payment for such products are correct; (b) To insure dealers who purchase milk and cream that their agents correctly weigh, sample, and test these products; (c) To insure correctness of tests made for official inspections or for public record. To achieve these purposes the law requires the licensing of all dealers who purchase milk and cream from producers, and the licensing of all persons sampling, weighing and testing milk and cream when the results serve as a basis of payment to producers.

Duties of the dairy inspection force deal with the calibration of glassware used in testing milk and cream; examination of all weighers, samplers, and testers and the issuance of licenses to those satisfactorily passing the examination; and inspection of the pertinent activities of weighers, samplers, testers and dairy plants.

### DEPARTMENT OF MARKETS

Activities of the Department of Markets serve to insure a fair and equitable treatment of the farmer in all dealings which he may have concerning the marketing of his products. In the performance of these responsibilities, the Department conducts market surveys, compiles and disseminates marketing information and market data, operates a market news service, provides an agricultural inspection and grading service, maintains a consumer information service and enforces the agricultural marketing laws of the state. The control work of the department is carried out under the authority of various state laws relating to the marketing of farm products. A close working relationship is maintained with other specialists in the Extension Service, the Maryland Crop Reporting Service, and the Consumer and Marketing Service of the United States Department of Agriculture. The voluntary

cooperation in these various activities brings to bear on agricultural marketing problems an effective combination of research, education and service.

The passage of the Federal Agricultural Research and Marketing Act gave additional impetus to the study and solution of agriculture's marketing problems. The Department of Markets is largely responsible for developing the state program under Title II of this act.

Information and assistance in all phases of marketing is available to all interested persons. Marketing specialists hold meetings and demonstrations in local communities. Field offices are located in Baltimore, Salisbury, Hancock and Pocomoke.

### MARYLAND LIVESTOCK SANITARY SERVICE

The Livestock Sanitary Service is charged with the responsibility of preventing the introduction of diseases of animals and poultry from outside of the state and with control and eradication of such diseases within the state. The Service cooperates with the State Department of Health in the suppression of diseases of animals and poultry which affect public health.

Control projects in tuberculosis, Johne's disease, hog cholera, brucellosis are conducted in cooperation with the Department of Agriculture. The field force of state employed veterinarians is augmented by a number of federal veterinarians in the conduct of these control programs. Programs designed to control rabies, pullorum in poultry, and many other disease conditions are also conducted by the Livestock Sanitary Service.

Facilities for the diagnosis of a wide variety of diseases are furnished in the main laboratory at College Park and in the branch laboratories at Salisbury, Preston, Centreville, Bel Air, Frederick, Hagerstown and Oakland.

### SEED INSPECTION

The Seed Inspection Service administers the state seed law; inspects seeds sold throughout the state; collects seed samples for laboratory examination; reports the results of the examinations to the parties concerned; publishes summaries of these reports which show the relative reliability of the label information supplied by wholesale seedsmen; cleans and treats tobacco seed intended for planting in the state; makes analyses, tests, and examinations of seed samples submitted to the laboratory; and advises seed users regarding the economic and intelligent use of seeds. The Service also cooperates with the Consumer and Marketing Service of the Department of Agriculture in the enforcement of the Federal Seed Act.

The work of the Seed Inspection Service is not restricted to the enforcement of the seed law however, for state citizens may submit seed samples to the laboratory for analysis, test or examination. Specific information regarding suitability for planting purposes of lots of seeds is thus made available to individuals without charge. The growth of this service has been steady since the establishment of the laboratory in 1912. Most

## SERVICE AND CONTROL PROGRAMS

Maryland citizens, urban and rural, are directly interested in seeds for planting in flower beds, lawns, gardens, or fields.

### STATE HORTICULTURAL DEPARTMENT

In 1916 several sections of existing law were combined and re-enacted with such changes in the wording as were necessary to bring them into conformity with the reorganization of the Maryland State College of Agriculture and Experiment Station and its Board of Trustees. Subsequently all regulatory functions including newly enacted Articles in regard to the bee diseases and mosquitoes were transferred to the State Board of Agriculture.

Work in this field is designed to control insects and plant diseases and to protect the public in the purchase of products of nurserymen and florists. A considerable part of the time of the staff is occupied by inspection of orchards, crops, nurseries, greenhouses, and floral establishments. Cooperation with the federal government in the inspection and certification of materials that come under quarantine regulations is another major function of the Department. The Department enforces the provisions of the Apiary Law, including inspection of apiaries. Other work of this Department includes control and eradication of diseases of strawberries and other small fruits, diseases of apples and peaches, inspection and certification of potatoes and sweet potatoes for seed, control of white pine blister rust, Dutch elm diseases, and oak wilt.

### STATE DEPARTMENT OF DRAINAGE

The State Department of Drainage was established in 1937. Its duties are to promote and encourage the drainage of agricultural lands in the state, to correlate the activities of the local drainage organizations in the state and to cooperate with state and federal agencies in the interest of a permanent program of improved drainage.

### STATE INSPECTION SERVICE

#### *Feeds, Fertilizer, Agricultural Liming Materials and Pesticides*

The protection of consumers and manufacturers of agricultural products against fraudulent practices, makes certain specialized laws necessary. These are classified as correct labeling laws, and are enforced by the State Inspection Service. Included in this legislation are the Feed, Fertilizer, Agricultural Liming Materials, and Pesticide Laws.

Work of enforcing these laws is divided into five distinct phases: First, the commodities concerned must be registered under acceptable brand names, and with proper labels; second, official samples must be collected by inspectors from all parts of the state; third, chemical and physical examinations must be made to establish that professed standards of quality are being met; fourth, results must be assembled, published and made available to all interested persons; and fifth, the prosecution of those responsible for flagrant violations.

Hundreds of tests also are made annually on feed, fertilizer, and lime samples submitted by state purchasers. No charge is made for this service.

Throughout its existence, this Department has cooperated with comparable federal agencies in every possible way. In this activity it has attained not only state-wide, but also a nationally recognized reputation for accuracy, timeliness, and unbiased fair treatment of the consumer and manufacturer alike.

The facilities of the Department are at all times available to supply the manufacturer with technical advice, and to safeguard him from unfair competition.

## SOIL CONSERVATION

In 1937 the Maryland Legislation established the State Soil Conservation Committee as an agency of the State Board of Agriculture. The same act also enabled the organization of the Soil Conservation Districts in Maryland. The twenty-four Districts that have been organized in Maryland include all the land in the state.

The State Committee is charged with the responsibility of coordinating the efforts of the Districts and encouraging the application of soil and water conservation practices.

The Committee receives applications for funds for watershed work under the Federal Watershed Protection and Flood Prevention Act (PL 566).

# The 1966-68 Faculty

## *Administrative Officers*

CAIRNS, Gordon M., Dean of Agriculture and Professor of Dairy Husbandry  
B.S., Cornell University, 1936; M.S., 1938; Ph.D., 1940.

POFFENBERGER, Paul R., Assistant Dean-Instruction, and Professor of Agricultural Economics

B.S., University of Maryland, 1935; M.S., 1937; Ph.D., American University, 1953.

HAUT, Irvin C., Director of Experiment Station and Professor of Horticulture  
B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.

AITON, Edward W., Director of Extension

B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.

ELLINGTON, Charles P., Director of Service and Control Programs and Extension Assistant Professor of Agronomy

B.S., University of Georgia, 1950; M.S., University of Maryland, 1952; Ph.D., Pennsylvania State University, 1964.

## *Faculty*

ANGELL, Frederick, Assistant Professor of Vegetable Crops

B.S., Southern Illinois University, 1960; M.S., 1961; Ph.D., University of Wisconsin, 1965.

ARBUCKLE, Wendell S., Professor of Dairy Science

B.S., Purdue University, 1933; A.M., University of Missouri, 1937; Ph.D., 1940.

AXLEY, John H., Associate Professor of Soils

B.A., University of Wisconsin, 1937; Ph.D., 1945.

BAILEY, Martin G., Extension Assistant Professor and Extension Supervisor, Agriculture

B.S., Hampton Institute, 1937; M.Ed., Cornell University, 1955.

BAKER, Robert L., Assistant Professor of Ornamental Horticulture

A.B., Swarthmore College, 1959; M.S., University of Maryland, 1962; Ph.D., 1965.

BAMFORD, Ronald, Professor of Botany and Dean of the Graduate School

B.S., University of Connecticut, 1924; M.S., University of Vermont, 1926; Ph.D., Columbia University, 1931.

BANDEL, V. Allan, Assistant Professor of Soils

B.S., University of Maryland, 1959; M.S., 1962; Ph.D., 1965.

BEAL, George M., Professor of Agricultural Economics

B.S., Utah State College, 1934; M.S., University of Wisconsin, 1938; Ph.D., 1942.

BEAN, George A., Assistant Professor of Botany

B.S., Cornell University, 1958; M.S., University of Minnesota, 1960; Ph.D., 1963.

- BEITER, Robert J.**, Instructor of Agricultural Economics  
B.S., University of Maryland, 1952; M.S., 1957.
- BENDER, Filmore E.**, Assistant Professor of Agricultural Economics  
B.S., University of California, 1961; M.S., North Carolina State College, 1964; Ph.D., 1965.
- BENTZ, Frank L., Jr.**, Associate Professor of Soils and Assistant to the President  
B.S., University of Maryland, 1942; Ph.D., 1952.
- BEYER, Edgar H.**, Assistant Professor of Agronomy  
B.S., University of Illinois, 1958; M.S., Purdue University, 1962; Ph.D., 1964.
- BICKLEY, William E.**, Professor and Head of Entomology  
B.S., University of Tennessee, 1934; M.S., 1936; Ph.D., University of Maryland, 1940.
- BISSELL, Theodore L.**, Extension Associate Professor of Entomology  
B.S., University of Maryland, 1920; M.S., Cornell University, 1936.
- BRENNAN, Melvin C.**, Instructor, Visual Aids  
B.S., University of Maryland, 1952.
- BRODIE, Herbert L.**, Extension Instructor of Agricultural Engineering  
B.S.A.E., Rutgers State University, 1964.
- BROWN, Albert C.**, Assistant Professor of Veterinary Science  
V.M.D., University of Pennsylvania, 1959.
- BROWN, Russell G.**, Associate Professor of Botany  
B.S., West Virginia University, 1929; M.S., 1930; Ph.D., University of Maryland, 1934.
- BUCKEL, W. Max**, Extension Assistant Professor and Extension Supervisor, Agriculture  
B.S., University of Maryland, 1951; M.S., Michigan State University, 1959.
- BURIC, John**, Associate Professor of Animal Science  
B.S., West Virginia University, 1948; M.S., University of Maryland, 1952; Ph.D., University of Illinois, 1960.
- BURKHARDT, George J.**, Professor of Agricultural Engineering  
B.S., University of Wisconsin, 1933; B.S.M.E., 1934; M.S., 1935.
- BYRD, Bruce W., Jr.**, Assistant Professor of Agronomy  
B.S., Clemson College, 1958; M.S., 1960; Ph.D., North Carolina State College, 1963.
- CAIN, Jarvis L.**, Assistant Professor of Agricultural Economics  
B.S., Purdue University, 1955; M.S., Ohio State University, 1956; Ph.D., 1961.
- CALDWELL, Billy E.**, Agronomist  
B.S., North Carolina State College, 1955; M.S., 1959; Ph.D., Iowa State University, 1963.

## FACULTY

CARDOZIER, Virgus R., Professor and Head of Agricultural and Extension Education

B.S., Louisiana State University, 1947; M.S., 1950; Ph.D., Ohio State University, 1952.

CASON, James L., Associate Professor of Dairy Science

B.S., Louisiana Polytechnic Institute, 1948; M.S., Michigan State College, 1950; Ph.D., North Carolina State College, 1956.

CASELL, Roy, Extension Associate Professor and Assistant Extension Director

B.S., West Virginia University, 1951; M.S., 1961; Ph.D., University of Wisconsin, 1962.

CHANCE, Charles M., Extension Associate Professor, Dairy Science

B.S., University of Maryland, 1941; M.S., Virginia Polytechnic Institute, 1948; Ph.D., Michigan State University, 1952.

CLARK, Neri A., Associate Professor of Agronomy

B.S., University of Maryland, 1954; Ph.D., 1959.

COLBY, Sterling R., Assistant Professor of Agronomy

B.S., Cornell University, 1956; M.S., Purdue University, 1961; Ph.D., 1964.

COMBS, Gerald F., Professor of Poultry Science

B.S., University of Illinois, 1940; Ph.D., Cornell University, 1948.

CONAWAY, Charlotte A., Extension Assistant Professor and Assistant State 4-H Club Agent

B.S., University of Maryland, 1947; M.S., University of Wisconsin, 1957.

CREEK, Richard D., Associate Professor of Poultry Science

B.S., Purdue University, 1951; M.S., 1954; Ph.D., 1955.

CROTHERS, John L., Jr., Extension Assistant Professor, Department of Markets

B.S., University of Maryland, 1949; M.S., 1954.

CURTIS, John M., Professor and Head of Agricultural Economics

B.S., North Carolina State College, 1947; M.S., 1949; Ph.D., University of Maryland, 1961.

DAVIS, Richard F., Professor and Head of Dairy Science

B.S., University of New Hampshire, 1950; M.S., Cornell University, 1952; Ph.D., 1953.

DEAL, Elwyn E., Assistant Professor of Agronomy

B.S., University of Georgia, 1958; M.S., 1960; Ph.D., Rutgers University, 1963.

DECKER, Morris A., Jr., Associate Professor

B.S., Colorado A. & M., 1949; M.S., Utah State College, 1950; Ph.D., University of Maryland 1953.

DENGLER, Harry W., Extension Associate Professor, Forestry

B.S., Syracuse University, 1935.

- DEVOLT, Harold M., Professor of Avian Pathology  
D.V.M., 1923; M.S., Cornell University, 1926.
- DITMAN, Lewis P., Research Professor of Entomology  
B.S., University of Maryland, 1926; M.S., 1929; Ph.D., 1931.
- DOETSCH, Raymond N., Professor of Microbiology  
B.S., University of Illinois, 1942; M.S., University of Indiana, 1944; Ph.D., University of Maryland, 1948.
- EDWARDS, Barbara H., Instructor of Botany  
A.B., George Washington University, 1960; M.A., 1963.
- EVANS, James G., Sr., Visiting Professor of Agricultural Economics  
B.A., Simpson College, 1921; M.A., University of Illinois, 1924.
- FANNING, Delvin S., Assistant Professor of Soil Mineralogy  
B.S., Cornell University, 1954; M.S., 1959; Ph.D., University of Wisconsin, 1964.
- FARWELL, Sanford, Extension Instructor and Exhibits Specialist  
B.A., Rhode Island School of Design, 1954.
- FELTON, Kenneth E., Associate Professor of Agricultural Engineering  
B.S.A., University of Maryland, 1950; B.S.C.E., 1951; M.S., Pennsylvania State University, 1962.
- FERGUSON, James Riley, Extension Associate Professor of Animal Science  
B.S., Colorado A. & M., 1941; M.S., Cornell University, 1951; Ph.D., 1953.
- FERNOW, Leonard R., Assistant Professor of Geology  
B.S., Cornell University, 1956; M.S., 1957; Ph.D., 1961.
- FOSTER, John E., Professor and Head of Animal Science  
B.S., North Carolina State College, 1926; M.S., Kansas State College, 1927; Ph.D., Cornell University, 1937.
- FOSTER, Phillips W., Associate Professor of Agricultural Economics  
B.S., Cornell University, 1953; M.S., University of Illinois, 1956; Ph.D., 1958.
- GALLOWAY, Raymond A., Associate Professor of Plant Physiology  
B.S., University of Maryland, 1952; M.S., 1956; Ph.D., 1958.
- GAUCH, Hugh G., Professor of Plant Physiology  
B.S., Miami University, 1935; M.S., Kansas State College, 1937; Ph.D., University of Chicago, 1939.
- GIENGER, Guy W., Associate Professor of Agricultural Engineering  
B.S., University of Maryland, 1933; M.S., 1936.
- GODFREY, Edward F., Extension Assistant Professor of Poultry Science  
B.S., University of New Hampshire, 1949; M.S., Ohio State University, 1950; Ph.D., 1952.
- GOUIN, Francis R., Extension Instructor in Ornamental Horticulture  
B.S., University of New Hampshire, 1962; M.S., University of Maryland, 1965.

## FACULTY

GOODWIN, Edwin E., Assistant Professor of Animal Science

B.S., Louisiana State University, 1946; M.S., Cornell, 1948; Ph.D., Washington State University, 1955.

GOYEN, Loren F., Assistant Professor and Assistant State 4-H Club Agent

B.S., Kansas State University, 1951; M.S., University of Maryland, 1959.

GRAHAM, Castillo, Associate Professor of Entomology

B.S., Mississippi A. & M. College, 1927; M.S., University of Maryland, 1930; Ph.D., 1932.

GREEN, Robert L., Professor and Head of Agricultural Engineering

B.S.A.E., University of Georgia, 1934; M.S., Iowa State College, 1939; Ph.D., Michigan State University, 1953.

GREEN, Willard W., Professor of Animal Science

B.S., University of Minnesota, 1933; M.S., 1934; Ph.D., 1939.

HAMILTON, Arthur B., Associate Professor of Agricultural Economics and Rural Civil Defense Program Leader

B.S., University of Maryland, 1929; M.S., 1931.

HARDING, Wallace C., Jr., Extension Assistant Professor of Entomology

B.S., University of Maryland, 1951; M.S., 1956; Ph.D., 1961.

HARRIS, Wesley L., Associate Professor in Agricultural Engineering

B.S.A.E., University of Georgia, 1953; M.S., 1958; Ph.D., Michigan State University, 1960.

HARRISON, Floyd P., Associate Professor of Entomology

B.S., Louisiana State University, 1951; M.S., 1953; Ph.D., University of Maryland, 1955.

HARRISON, George K., Assistant Professor of Botany

B.A., Western Maryland College, 1935; M.S., University of Maryland, 1956; Ph.D., 1958.

HATZIOLOS, Basil C., Associate Professor of Pathology

D.V.M., Veterinary School of Alfort, France, 1929; DR. VET. IN AN. HUS., Veterinary School of Berlin, Germany, 1932.

HAVILAND, Elizabeth E., Lecturer in Entomology

A.B., Wilmington (Ohio) College, 1923; M.A., Cornell University, 1926; M.S., University of Maryland, 1936; Ph.D., 1945.

HAWES, Russell C., Professor of Marketing

B.S., Rhode Island State College, 1921; M.S., University of Rhode Island, 1942.

HAWKINS, Ezelle M., Extension Assistant Professor and Community Development Specialist

B.S., Prairie View A & M College, 1938; M.S., Cornell University, 1965.

HAWKINS, Joyce R., Extension Assistant Professor and Extension Supervisor, Home Economics

B.S., University of Maryland, 1956; M.S., 1962.

- HELBACKA, Norman V., Associate Professor, Poultry Science  
B.S., University of Minnesota, 1952; M.S., 1954; Ph.D., 1956.
- HEMKEN, Roger W., Associate Professor of Dairy Science  
B.S., University of Illinois, 1950; M.S., 1954; Ph.D., Cornell University, 1957.
- HILBERT, Lavonia, Extension Associate Professor and Clothing Specialist  
B.S., West Virginia University, 1937; M.A., Columbia University, 1946.
- HOECKER, Harold H., Extension Assistant Professor of Agricultural Economics  
B.S., Iowa State College, 1941.
- HOLLIS, William L., Research Associate Professor of Vegetable Crops  
B.S., University of Delaware, 1952; M.S., 1954; Ph.D., University of Maryland, 1957.
- HOYERT, John H., Associate Professor of Agronomy  
B.S., University of Maryland, 1943; M.S., 1949; Ph.D., 1951.
- HUNTER, Herman A., Extension Assistant Professor of Vegetable Crops  
B.S., Clemson College, 1923; M.S., University of Maryland, 1926.
- ISHEE, Sidney, Associate Professor of Agricultural Economics  
B.S., Mississippi State College, 1950; M.S., Pennsylvania State University, 1952; Ph.D., 1957.
- JOHNSON, Carl N., Extension Assistant Professor of Landscape Gardening  
B.S., Michigan State College, 1947.
- JOHNSON, Robert B., Associate Professor of Veterinary Physiology  
A.B., University of South Dakota, 1939.
- JOHNSON, ROBERT L., Assistant Professor of Agricultural and Extension Education  
B.S., University of Nebraska, 1951; M.S., University of Wisconsin, 1956; Ph.D., 1958.
- JONES, Jack Colvard, Professor of Entomology  
B.S., Alabama Polytechnic Institute, 1942; Ph.D., Iowa State College, 1950.
- KANTZES, James G., Associate Professor of Plant Pathology  
B.S., University of Maryland, 1951; M.S., 1954; Ph.D., 1957.
- KARLANDER, Edward P., Research Associate—Plant Physiology  
B.S., University of Vermont, 1960; M.S., University of Maryland, 1962; Ph.D., 1964.
- KATZ, Ira, Assistant Professor, Dairy Science  
B.S., University of Georgia, 1957; M.S., University of Maryland, 1959; Ph.D., 1962.
- KEENEY, Mark, Professor of Dairy Science  
B.S., Pennsylvania State College, 1942; M.S., Ohio State University, 1948; Ph.D., Pennsylvania State College, 1950.

## FACULTY

KING, Raymond L., Associate Professor of Dairy Science

A.B., University of California, 1955; Ph.D., 1958.

KLARMAN, William L., Assistant Professor of Plant Pathology

B.S., Eastern Illinois State College, 1957; M.S., University of Illinois, 1960; Ph.D., 1962.

KRAMER, Amihud, Professor of Horticulture

B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1942.

KRAUSS, Robert W., Professor of Plant Physiology and Head, Department of Botany

A.B., Oberlin College, 1947; M.S., University of Hawaii, 1949; Ph.D., University of Maryland, 1951.

KRESGE, Conrad B., Associate Professor of Soils

B.S., Pennsylvania State University, 1953; M.S., 1956; Ph.D., 1959.

KRESTENSEN, Elroy R., Assistant Professor of Entomology

B.S., University of Florida, 1949; M.S., 1951; Ph.D., University of Maryland, 1962.

KUHN, Albin O., Professor of Agronomy and Vice-President, Baltimore Campuses

B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.

KRUSBERG, Loren R., Associate Professor of Plant Pathology

B.S., University of Delaware, 1954; M.S., North Carolina State College, 1956; Ph.D., 1959.

LADSON, Thomas A., Head of Veterinary Science and Director of the Live Stock Sanitation Service

D.V.M., University of Pennsylvania, 1939.

LANGSDALE, Elizabeth, Extension Assistant Professor and Home Furnishing Specialist

B.S., Illinois State University, 1938; M.E., Pennsylvania State University, 1954.

LANGFORD, George S., Professor of Entomology and State Entomologist

B.S., Clemson College, 1921; M.S., University of Maryland, 1924; Ph.D., Ohio State University, 1929.

LEFFEL, Emory C., Associate Professor of Animal Science

B.S., University of Maryland, 1943; M.S., 1947; Ph.D., 1953.

LESSLEY, Billy V., Assistant Professor of Agricultural Economics

A.S., Arkansas Polytechnic College, 1955; B.S., University of Arkansas, 1957; M.S., 1960; Ph.D., University of Missouri, 1965.

LEVRING, Tore, Visiting Professor of Algal Physiology

B.S., University of Lund, 1934; M.S., 1936; Ph.D., 1940.

LIDEN, Conrad H., Assistant Professor, Administrative Assistant to the Dean

B.S., University of Maryland, 1942; M.S., 1949.

- LINK, Conrad B., Professor of Floriculture  
B.S., Ohio State University, 1933; M.S., 1934; Ph.D., 1940.
- LOAR, Margaret T., Extension Professor, Assistant State Leader, Extension Home Economics  
B.S., University of Maryland, 1941.
- LOCKARD, J. David, Associate Professor of Botany and Education  
B.S., Pennsylvania State College, 1951; M.Ed., Pennsylvania State University, 1955; Ph.D., 1962.
- MANESS, James C., Instructor of Agricultural Economics  
B.S., University of Georgia, 1958; M.S., Cornell University, 1960.
- MANS, Rusty J., Associate Professor of Botany  
B.S., University of Florida, 1952; M.S., 1954; Ph.D., Western Reserve University, 1959.
- MARSHALL, J. Paxton, Associate Professor of Agricultural Economics and Extension Assistant Director, Programs  
B.S., University of Kentucky, 1957; M.A., Michigan State University, 1957; Ph.D., 1961.
- MATTHEWS, Floyd V., Jr., Assistant Professor of Agricultural Engineering  
B.S.A.E., Virginia Polytechnic Institute, 1950; M.S., Oklahoma State University, 1951.
- MATTHEWS, William A., Associate Professor of Vegetable Crops  
B.S., Virginia Polytechnic Institute, 1928; M.S., University of Maryland, 1930.
- MATTICK, Joseph F., Associate Professor of Dairy Science  
B.S., Pennsylvania State College, 1942; Ph.D., 1950.
- MCDONALD, Russell F., Associate Professor of Agricultural Economics  
B.S., Ohio State University, 1950; M.S., 1958; Ph.D., 1959.
- McKEE, Claude G., Associate Professor of Agronomy  
B.S., University of Maryland, 1951; M.S., 1955; Ph.D., 1959.
- MCLUCKIE, Virginia, Extension Associate Professor and Home Economist  
B.S., University of Maryland, 1941; M.S., 1953.
- MEADE, John A., Associate Professor of Agronomy  
B.S., University of Maryland, 1953; M.S., 1955; Ph.D., Iowa State College, 1958.
- MENZER, Robert E., Assistant Professor of Entomology  
B.S., University of Pennsylvania, 1960; M.S., University of Maryland, 1962; Ph.D., University of Wisconsin, 1964.
- MERRICK, Charles P., Extension Associate Professor of Agricultural Engineering  
B.S.C.E., University of Maryland, 1933.
- MESSERSMITH, Donald H., Associate Professor of Entomology  
B.Ed., University of Toledo, 1951; M.S., University of Michigan, 1953; Ph.D., Virginia Polytechnic Institute, 1962.

## FACULTY

- MEYER, Amos R., Extension Associate Professor of Marketing  
B.S., Ohio State University, 1940.
- MILLER, Frederick P., Assistant Professor of Soils  
B.S., Ohio State University, 1958; M.S., 1961; Ph.D., 1965.
- MILLER, James R., Professor and Head of Agronomy  
B.S., University of Maryland, 1951; M.S., 1953; Ph.D., 1956.
- MOHANTY, Sashi B., Assistant Professor of Veterinary Virology  
B.V.SC. & A.H., Bihar University, India; M.S., 1961; Ph.D., University of Maryland.
- MOLINE, Waldemar J., Assistant Professor of Agronomy  
B.S., Wisconsin State University, 1959; M.S., University of Minnesota, 1961; Ph.D., Iowa State University, 1965.
- MOORE, John R., Associate Professor of Agricultural Economics  
B.S., Ohio State University, 1951; M.S., Cornell University, 1955; Ph.D., University of Wisconsin, 1959.
- MORGAN, Delbert T., Jr., Professor of Botany  
B.S., Kent State University, 1940; M.A., Columbia University, 1942; Ph.D., 1948.
- MORGAN, Omar D., Jr., Associate Professor of Plant Pathology  
B.Ed., Illinois State Normal University, 1940; Ph.D., University of Illinois, 1950.
- MORRIS, John L., Extension Associate Professor of Dairy Science  
B.S., Iowa State College, 1943; M.S., University of Delaware, 1958.
- MURRAY, Ray A., Associate Professor of Agricultural Economics  
B.S., University of Nebraska, 1934; M.A., Cornell University, 1938; Ph.D., 1949.
- NANTZ, Evelyn R., Extension Assistant Professor and Home Management Specialist  
B.S., Oklahoma State University, 1939; M.S., 1958.
- NEWCOMER, Joseph L., Assistant Professor of Agronomy  
B.S., University of Maryland, 1950; M.S., 1955.
- NICHOLSON, James L., Extension Assistant Professor of Poultry Science  
B.S., University of Maryland, 1951.
- OSBURN, Donald E., Extension Assistant Professor and Assistant 4-H Club Agent  
B.S., West Virginia University, 1956; M.S., 1959.
- PATERSON, Robert A., Associate Professor of Botany  
B.A., University of Nevada, 1949; M.A., Stanford University, 1951; Ph.D., University of Michigan, 1957.
- PATTERSON, Glenn W., Assistant Professor of Plant Physiology  
B.S., North Carolina State University, 1960; M.S., University of Maryland, 1963; Ph.D., 1964.

## FACULTY

**PHEIL, Judith A. (Mrs.)**, Extension Assistant Professor, and Food and Nutrition Specialist

B.S., Hood College, 1931.

**PLOWMAN, Robert D.**, Lecturer in Dairy Science

B.S., Utah State College, 1951; M.S., University of Minnesota, 1955; Ph.D., 1956.

**PLUMER, Gilbert J.**, Associate Professor of Veterinary Science

B.S., University of Maryland, 1949; D.V.M., New York State Veterinary College, Cornell University, 1953.

**QUIGLEY, George D.**, Associate Professor of Poultry Science and Director Institute of Applied Agriculture

B.S., Michigan State College, 1925.

**RAPPLEYE, Robert D.**, Associate Professor of Botany

B.S., University of Maryland, 1941; M.S., 1947; Ph.D., 1949.

**REBERT, Burnell K.**, Extension Instructor, Marketing

B.S., Elizabethtown College, 1947.

**REYNOLDS, Charles W.**, Professor of Vegetable Crops

B.A., University of Alabama, 1941; B.S., Alabama Polytechnic Institute, 1947; M.S., 1949; Ph.D., University of Maryland, 1954.

**ROGERS, Benjamin L.**, Extension Associate Professor of Pomology

B.S., Clemson College, 1943; M.S., University of Minnesota, 1947; Ph.D., University of Maryland, 1950.

**ROTHGEB, Russell G.**, Professor of Agronomy

B.S., University of Maryland, 1924; M.S., Iowa State College, 1925; Ph.D., University of Maryland, 1928.

**SCHERMERHORN, Richard W.**, Associate Professor of Agricultural Economics

B.S., University of Georgia, 1958; M.S., 1959; Ph.D., Oregon State University, 1962.

**SCOTT, Leland E.**, Professor of Horticultural Physiology

B.S., University of Kentucky, 1927; M.S., Michigan State College, 1929; Ph.D., University of Maryland, 1943.

**SEELEY, Donald J.**, Instructor in Dairy Science

B.S., Virginia Polytechnic Institute, 1950.

**SHAFFNER, Clyne S.**, Professor and Head of Poultry Science

B.S., Michigan State College, 1938; M.S., 1940; Ph.D., Purdue University, 1947.

**SHANKS, James B.**, Professor of Floriculture

B.S., Ohio State University, 1939; M.S., 1946; Ph.D., 1949.

**SHORB, Mary S.**, Research Professor of Poultry Science

B.S., College of Idaho, 1928; Sc.D., Johns Hopkins University, 1933.

**SHRIVER, David**, Assistant Professor of Entomology

B.S., University of Maryland, 1960; M.S., 1963.

## FACULTY

- SIEGEL, Malcolm R., Research Associate—Plant Pathology  
B.S., University of Connecticut, 1955; M.S., University of Delaware, 1959; Ph.D., University of Maryland, 1963.
- SIEGRIST, Henry G., Jr., Assistant Professor of Geology  
B.A., Lehigh University, 1965; M.S., Pennsylvania State University, 1959; Ph.D., 1961.
- SISLER, Hugh D., Professor in Plant Pathology  
B.S., University of Maryland, 1949; M.S., 1951; Ph.D., 1953.
- SMITH, Clodus R., Associate Professor of Agricultural and Extension Education and Director of Summer School  
B.S., Oklahoma A & M College, 1950; M.S., 1955; Ed.D., Cornell University, 1960.
- SMITH, Harold D., Professor of Agricultural Economics  
B.A., Bridgewater College, 1943; M.S., University of Maryland, 1947; Ph.D., American University, 1952.
- SNYDER, Robert J., Associate Professor of Vegetable Crops  
B.S., Pennsylvania State College, 1949; M.S., 1951; Ph.D., Pennsylvania State University, 1955.
- SOERGEL, Kenneth P., Assistant Professor of Landscape Gardening  
B.S., Pennsylvania State University, 1961; M.L.A., Harvard University, 1963.
- SOROKIN, Constantine A., Research Associate—Plant Physiology  
A.B., Don Institute, 1927; M.A., Academy of Sciences (Moscow), 1936; Ph.D., University of Texas, 1955.
- STADELBACHER, Glen J., Extension Assistant Professor of Horticulture  
B.S., Southern Illinois University, 1958; Ph.D., University of Maryland, 1962.
- STARK, Francis C., Professor and Head of Horticulture  
B.S., Oklahoma A. & M., 1940; M.S., University of Maryland, 1941; Ph.D., 1948.
- STEINHAUER, Allen L., Associate Professor of Entomology  
B.S., University of Manitoba, 1953; M.S., Oregon State College, 1955; Ph.D., 1958.
- STEVENS, George A., Extension Associate Professor of Agricultural Economics  
B.S., Virginia Polytechnic Institute 1941; Ph.D., University of Maryland, 1957.
- STEWART, Larry E., Instructor of Agricultural Engineering  
B.S.A.E., West Virginia, 1960; M.S., 1961.
- STEWART, Wolcott E., Associate Professor of Dairy Science  
B.S., Cornell University, 1953; M.S., 1956; Ph.D., 1957.
- STOUT, Ernest R., Research Associate—Botany  
B.S., Appalachian State Teachers College, 1961; Ph.D., University of Florida, 1965.
- STREET, Orman E., Professor of Agronomy  
B.S., South Dakota State College, 1924; M.S., Michigan State College, 1927; Ph.D., 1933.

- STRICKLING, Edward, Associate Professor of Soils  
B.S., Ohio State University, 1937; Ph.D., 1949.
- SUPPLEE, William C., Research Associate of Poultry Science  
B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1931.
- SUTOR, Richard E., Assistant Professor of Agricultural Economics  
B.S., South Dakota University, 1960; Ph.D., Iowa State University, 1965.
- TAYLOR, M. Hal, Extension Instructor of Poultry Science  
B.S., Kansas State University, 1962; M.S., 1964.
- TERBORGH, John, Assistant Professor of Botany  
A.M., Harvard University, 1960; Ph.D., 1963.
- THOMPSON, Patrick H., Assistant Professor of Entomology  
B.S., Auburn University, 1955; M.S., University of Wisconsin, 1962; Ph.D., 1964.
- TODD, Hermann S., Instructor in Horticulture  
B.S., Ohio State University, 1937.
- TUTHILL, Dean F., Associate Professor of Agricultural Economics  
B.S., Cornell University, 1949; M.S., University of Illinois, 1954; Ph.D., 1958.
- TWIGG, Bernard A., Extension Associate Professor  
B.S., University of Maryland, 1952; M.S., 1955; Ph.D., 1959.
- VANDERSALL, John H., Associate Professor of Dairy Science  
B.S., Ohio State University, 1950; M.S., 1954; Ph.D., 1959.
- WALKER, William P., Professor of Agricultural Economics  
B.S., University of Maryland, 1921; M.S., 1924.
- WEAVER, Leslie O., Extension Professor of Plant Pathology  
B.S.A., Ontario Agricultural College, 1934; Ph.D., Cornell University, 1943.
- WELLING, M. Gist, Extension Associate Professor and Assistant Director, Field Operations  
B.S., University of Maryland, 1942; M.S., Cornell University, 1957.
- WILCOX, Frank H., Associate Professor of Poultry Science  
B.S., University of Connecticut, 1951; M.S., Cornell University, 1953; Ph.D., 1955.
- WILEY, Robert C., Associate Professor of Horticulture Processing  
B.S., University of Maryland, 1949; M.S., 1950; Ph.D., Oregon State College, 1953.
- WILLIAMS, Walter L., Associate Professor of Dairy Science  
B.S., University of Missouri, 1952; Ph.D., 1955.
- WILSON, W. Sherard, Extension Professor and State 4-H Club Agent  
B.S., University of Maryland, 1932.
- WINN, Paul N., Research Associate Professor of Agricultural Engineering  
B.S., Virginia Polytechnic Institute, 1947; M.S., 1958.

## FACULTY

WOOD, Francis E., Instructor of Entomology  
B.S., University of Missouri, 1958; M.S., 1962.

WYSONG, John W., Associate Professor of Agricultural Economics  
B.S., Cornell University, 1953; M.S., University of Illinois, 1954; Ph.D., Cornell University, 1957.

YOUNG, Edgar P., Associate Professor of Animal Science  
B.S., Ohio State University, 1954; M.S., 1956; Ph.D., 1958.

### *Emeriti*

CORY, Ernest N., Professor of Entomology, Emeritus  
B.S., Maryland Agricultural College, 1909; M.S., 1913; Ph.D., American University, 1926.

DEVAULT, Samuel H., Professor of Agricultural Economics and Marketing, Emeritus  
A.B., Carson-Newman College, 1912; A.M., University of North Carolina, 1915; Ph.D., Massachusetts State College, 1931.

KEMP, William B., Director of Experiment Station, Emeritus  
B.S., University of Maryland, 1912; Ph.D., American University, 1928.

NORTON, John B. S., Professor of Botany, Emeritus  
B.S., Kansas State College, 1896; M.S., 1900; Sc.D., (Hon.), University of Maryland.

NYSTROM, Paul E., Director of Extension and Professor of Agricultural Economics, Emeritus  
B.S., University of California, 1928; M.S., University of Maryland, 1931; M.P.A., Harvard University, 1948; D.P.A., 1951.

SYMONS, Thomas B., Dean of Agriculture, Emeritus  
B.S., Maryland Agricultural College, 1902; M.S., Maryland State College, 1905; D.Agr., University of Maryland, 1918.

### \*SUPERVISING TEACHERS OF AGRICULTURAL EDUCATION

BAER, Wilfred O., B.S., The Pennsylvania State University, 1942; M.S., 1952  
Sudlersville High School, Sudlersville, Maryland.

BEVARD, Carl W., B.S., University of Maryland, 1950; M.Ed., 1953  
Glenelg High School, Glenelg, Maryland.

BURLIN, Walter W., B.S., University of Maryland, 1951; M.S., University of Delaware, 1958.  
Bel Air High School, Bel Air, Maryland.

COBB, Robert A., B.S., University of Maryland, 1954  
North Harford High School, Pylesville, Maryland.

---

\*Teachers of vocational agriculture who supervise student teachers during the student teaching period in cooperation with the Department of Agricultural and Extension Education.

## FACULTY

COOPER, Elmer T., B.S., University of Maryland, 1956; M.S., 1965.

North Harford High School, Pylesville, Maryland.

MILLER, Harry T., B.S., University of Maryland, 1950; M.S., 1952

Frederick High School, Frederick, Maryland.

REMSBURG, George C., B.S., University of Maryland, 1939; M.S., 1951

Walkersville High School, Walkersville, Maryland.

SCOTT, Joseph K., B.A., Bridgewater College, 1935; M.S., Virginia Polytechnic Institute, 1940

Williamsport High School, Williamsport, Maryland.

THOMPSON, Harold H., B.S., University of Maryland, 1946; M.S., 1960.

Mt. Airy High School, Mt. Airy, Maryland.

THOMPSON, John L., B.S., University of Maryland, 1951; M.S., 1959

Linganore High School, Frederick Maryland.

TOLLEY, Leonard E., B.S., Virginia Polytechnic Institute, 1951; M.S., University of Maryland, 1965.

Damascus High School, Damascus, Maryland.







*CATALOG OF THE*  
COLLEGE OF  
ARTS AND  
SCIENCES  
1965-1967

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*September 1, 1965*

*Number 3*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Re-entered at the Post Office at College Park, Maryland, as second class mail matter under the Act of Congress on August 24, 1912. Published twenty-nine times.



# Contents

## *General*

University Calendar .....	iv	General Requirements for	
Board of Regents .....	vi	Degrees .....	3
Officers of the University .....	vii	General Education	
Standing Committees, Faculty		Requirements .....	4
Senate .....	xi	College Requirements .....	6
General Information .....	1	Junior Requirements .....	8
History .....	1	Normal Load .....	9
Application Information .....	1	Advisers .....	9
Requirements for Admission .....	2	Electives in Other Schools	
Costs .....	2	and Colleges .....	9
Degrees .....	2	Air Science .....	9
Residence .....	3	Certification of High School	
For Additional Information .....	3	Teachers .....	9
Academic Information .....	3	Honors .....	10

## *Programs and Course Offerings*

American Studies .....	11	General Physical Sciences .....	58
Art .....	12	Geography .....	58
Astronomy .....	18	Government and Politics .....	59
Botany .....	21	History .....	60
Chemistry .....	22	Mathematics .....	70
Classical Languages and		Microbiology .....	84
Literatures .....	30	Molecular Physics .....	88
Comparative Literature .....	32	Music .....	89
Computer Science .....	35	Applied Music .....	96
Economics .....	36	Philosophy .....	97
English Language and		Physics and Astronomy .....	102
Literature .....	37	Pre-Professional Curricula .....	112
Foreign Languages and		Pre-Dentistry .....	113
Literatures .....	42	Pre-Law .....	114
Chinese .....	45	Pre-Medicine .....	115
French .....	45	Related Professions .....	116
German .....	49	Psychology .....	117
Hebrew .....	51	Sociology .....	125
Italian .....	52	Anthropology .....	132
Russian .....	52	Speech and Dramatic Art .....	133
Spanish .....	53	Zoology .....	143
General Biological Sciences .....	57		
Faculty Listing .....			151

# University Calendar, 1965-66

(TENTATIVE)

## *FALL SEMESTER, 1965*

### SEPTEMBER

- 13-17 Monday through Friday—Fall Semester Registration
- 20 Monday—Instruction begins

### NOVEMBER

- 24 Wednesday, after last class—Thanksgiving recess begins
- 29 Monday, 8:00 A.M.—Thanksgiving recess ends

### DECEMBER

- 22 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Monday, 8:00 A.M.—Christmas recess ends
- 17 Monday—Pre-exam Study Day
- 18-24 Tuesday-Monday—Fall Semester Examinations

## *SPRING SEMESTER, 1966*

### JANUARY-FEBRUARY

- 31-4 Monday through Friday—Spring Semester Registration
- 7 Monday—Instruction begins
- 22 Tuesday—Washington's Birthday, holiday

### MARCH

- 25 Friday—Maryland Day, not a holiday

### APRIL

- 7 Thursday, after last class—Easter recess begins
- 12 Tuesday, 8:00 A.M.—Easter recess ends

### MAY

- 11 Wednesday—AFROTC Day
- 25 Wednesday—Pre-exam Study Day
- 26-June 3 Thursday through Friday—Spring Semester Examinations
- 29 Sunday—Baccalaureate Exercises
- 30 Monday—Memorial Day, holiday

### JUNE

- 4 Saturday—Commencement Exercises

## *SUMMER SESSION, 1966*

### JUNE

- 20-21 Monday, Tuesday—Registration, Summer Session
- 22 Wednesday—Instruction begins
- 25 Saturday—Classes (Monday schedule)

### JULY

- 4 Monday—Independence Day, holiday
- 9 Saturday—Classes (Tuesday schedule)

### AUGUST

- 12 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1966*

### JUNE

- 13-17 Monday through Friday—Rural Women's Short Course

### AUGUST

- 1-5 Monday through Friday—4-H Club Week

### SEPTEMBER

- 6-9 Tuesday through Friday—Fireman's Short Course

# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

12-16 Monday-Friday—Fall Semester Registration

19 Monday—Instruction begins

### NOVEMBER

23 Wednesday, after last class—Thanksgiving recess begins

28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

21 Wednesday, after last class—Christmas recess begins

### JANUARY

3 Tuesday, 8:00 A. M.—Christmas recess ends

18 Wednesday—Pre-exam Study Day

19-25 Thursday-Wednesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

31-Feb. 3 Tuesday-Friday—Spring Semester Registration

### FEBRUARY

6 Monday—Instruction begins

22 Wednesday—Washington's Birthday, holiday

### MARCH

23 Thursday, after last class—Easter recess begins

28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

10 Wednesday—AFROTC Day

24 Wednesday—Pre-exam Study Day

25-June 2 Thursday-Friday—Spring Semester Examinations

28 Sunday—Baccalaureate Exercises

30 Tuesday—Memorial Day, holiday

### JUNE

3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

19-20 Monday-Tuesday—Registration, Summer Session

21 Wednesday—Instruction begins

24 Saturday—Classes (Monday schedule)

### JULY

4 Tuesday—Independence Day, holiday

8 Saturday—Classes (Tuesday schedule)

### AUGUST

11 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

MRS. JOHN L. WHITEHURST

*4101 Greenway, Baltimore, 21218*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT. BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### ASSISTANT TO THE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### ASSISTANT TO THE VICE PRESIDENT FOR ACADEMIC AFFAIRS

Leslie R. Bundgaard—*B.S., University of Wisconsin, 1948; M.S., 1949; Ph.D., Georgetown University, 1954.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schutz—*B.S., University of Maryland, 1938; M.S., 1940.*

#### DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

#### DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

#### ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

#### DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

#### ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

### *Emeriti*

#### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

#### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

#### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

### *Deans of the Schools and Colleges*

#### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

#### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

#### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

#### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

#### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

#### ACTING DEAN OF THE COLLEGE OF ENGINEERING

Russell B. Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY  
Homer W. Schamp, Jr.—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1926; *Ph.D.*, *Columbia University*, 1931.

ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna R. Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, 1939.

DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

DEAN OF THE SCHOOL OF LIBRARY SCIENCE

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

DEAN OF THE SCHOOL OF NURSING

Florence M. Gipe—*B.S.*, *Catholic University of America*, 1937; *M.S.*, *University of Pennsylvania*, 1940; *Ed.D.*, *University of Maryland*, 1952.

DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

*Directors of Educational Services and Programs*

ACTING DEAN FOR STUDENT LIFE

Francis A. Gray—*B.S.*, *University of Maryland*, 1943.

DEAN OF WOMEN

Helen E. Clarke—*B.S.*, *University of Michigan*, 1943; *M.A.*, *University of Illinois*, 1951; *Ed.D.*, *Teachers College, Columbia University*, 1960.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### ACTING DIRECTOR, COMPUTER SCIENCE CENTER

John P. Menard—*B.A., San Michael's College, 1954*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY

GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE

COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING

COMMITTEE ON INSTRUCTIONAL PROCEDURES

COMMITTEE ON SCHEDULING AND REGISTRATION

COMMITTEE ON PROGRAMS, CURRICULA AND COURSES

COMMITTEE ON FACULTY RESEARCH

COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS

COMMITTEE ON LIBRARIES

COMMITTEE ON UNIVERSITY PUBLICATIONS

COMMITTEE ON INTERCOLLEGIATE COMPETITION

COMMITTEE ON PROFESSIONAL ETHICS. ACADEMIC FREEDOM  
AND TENURE

COMMITTEE ON APPOINTMENTS, PROMOTIONS AND SALARIES

COMMITTEE ON FACULTY LIFE AND WELFARE

COMMITTEE ON MEMBERSHIP AND REPRESENTATION

COMMITTEE ON COUNSELING OF STUDENTS

COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES

FINANCIAL AIDS AND SELF-HELP

STUDENT PUBLICATIONS AND COMMUNICATIONS

RELIGIOUS LIFE

STUDENT HEALTH AND SAFETY

STUDENT DISCIPLINE

BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

## GENERAL INFORMATION

THE COLLEGE OF ARTS AND SCIENCES OFFERS ITS STUDENTS A LIBERAL education. It seeks to develop graduates who can deal intelligently with the problems which confront them and whose general education will be a continuing source not only of material profit but of genuine personal satisfaction. It also offers each student the opportunity to concentrate in the field of his choice; this element of depth serves both as an integral part of his education and as a foundation for further professional training or pursuits.

### *History*

This College is an outgrowth of the Division of Language and Literature and the Division of Applied Science and the later School of Liberal Arts of Maryland State College. In 1921 the School of Liberal Arts and the School of Chemistry were combined and other physical and biological sciences were brought into the newly formed College of Arts and Sciences. In later reorganizations some departments have been added and some transferred to the administrative control of other colleges.

### *Application Information*

FALL SEMESTER. All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before July 15. Any student registering for nine or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between July 15 and September 1. Applicants for full-time attendance filing after July 15 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by September 1.

SPRING SEMESTER. The deadline for the receipt of applications for the spring semester is January 1.

UNIVERSITY COLLEGE. The application deadlines and fees *do not* apply to students registering in the evening classes offered by the University College.

GRADUATE SCHOOL. Application for admission to the Graduate School must be made by September 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission

## GENERAL INFORMATION

to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline date is generally June 1.

### *Requirements for Admission*

The requirements for admission to the College of Arts and Sciences are, in general, the same as those for admission to the other colleges and schools of the University. Application must be made to the Director of Admissions, University of Maryland, College Park, Maryland.

The student who intends to pursue a program of study in the College of Arts and Sciences should include the following subjects in his high school program: English, four units; college preparatory mathematics (algebra, plane geometry), three or four units; foreign language, two or more units; biology, chemistry, or physics, two units; history and social sciences, one or more units.

The student who wishes to major in chemistry, mathematics, physics, botany, microbiology, zoology, or who wishes to follow a pre-medical or pre-dental program, should include four units of college preparatory mathematics (algebra, plane geometry, trigonometry, and more advanced mathematics, if available). He should also include chemistry and physics.

### *Costs*

Basic annual costs of attending the University for full-time undergraduate students on the College Park campus are as follows:

	<i>Maryland residents</i>	<i>Non-residents of Maryland</i>
Fixed charges	\$270.00	\$270.00
Special fees	96.00	96.00
Non-resident tuition		400.00
Board	440.00	440.00
Lodging	320.00	420.00

A fee of \$10.00 must accompany a prospective student's application for admission. If the student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee.

### *Degrees*

Students of this College who satisfactorily complete curricula with majors in departments of the humanities or social sciences are awarded the degree of Bachelor of Arts.<sup>1</sup> Those who satisfactorily complete curricula with majors in the Department of Mathematics or the biological and physical

---

<sup>1</sup> The Departments of Economics, Geography, and Government and Politics, although administratively in the College of Business and Public Administration, offer courses for Arts and Sciences students. Majors may be elected in these departments as in those of the departments administered by the College of Arts and Sciences.

## ACADEMIC INFORMATION

sciences are awarded the degree of Bachelor of Science.<sup>2</sup> Those who complete satisfactorily a special professional program in the Department of Music are awarded the degree of Bachelor of Music.

### *Residence*

The last thirty semester hours credit of any curriculum leading to a baccalaureate degree in the College of Arts and Sciences must be taken in residence in this University.

### *For Additional Information*

Detailed information concerning admission, fees and expenses, scholarships and awards, student life, and other material of a general nature may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Catalog Mailing Office, North Administration Building, University of Maryland, College Park. A detailed explanation of the regulations of student and academic life may be found in the University publication titled *University General and Academic Regulations*.

Requests for course catalogs for the individual schools and colleges should be directed to the deans of these respective units, addressed to:

#### COLLEGES LOCATED AT COLLEGE PARK:

Dean

(College in which you are interested)

University of Maryland

College Park, Maryland 20742

#### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean

(School in which you are interested)

University of Maryland

Lombard and Greene Streets

Baltimore, Maryland 21201

## ACADEMIC INFORMATION

### *General Requirements for Degrees*

The baccalaureate degree from the College of Arts and Sciences may be conferred upon a student who has satisfied the following requirements:

1. University (General Education) requirements.
2. College of Arts and Sciences requirements.

---

<sup>2</sup> The Department of Botany, although administered by the College of Agriculture, offers courses for Arts and Sciences students. A major may be elected in this department as in those of the departments administered by the College of Arts and Sciences.

### *General Education Requirements*

A college education implies something more than an adequate technical training in the student's field of specialization. In order that each graduate with a Bachelor's degree may gain a liberal education as well as a specialized one, the University has established a General Education Requirement. This requirement consists of 34 semester hours of credit in six general fields. There is a wide choice in specific courses which may be used to satisfy requirements in all of the six fields except English. Physical Education and Health requirements for all students are taken in addition to this 34-hour group of courses.

1. The General Education courses are as follows:

In *English* (9 hours): Engl. 1—Composition; Engl. 3 and 4—World Literature.

In *Fine Arts or Philosophy* (3 hours), three-credit courses in five departments are available, as follows: ART COURSES: 10—Introduction to Art; 60 or 61—History of Art; 65 or 66—Masterpieces of Painting; 67 or 68—Masterpieces of Sculpture; 70 or 71—Masterpieces of Architecture; 80—History of American Art. DANCE COURSES: 32—Introduction to Dance; 182—History of Dance; 184—Theory and Philosophy of Dance. MUSIC COURSE: 20—Survey of Music Literature. SPEECH COURSES: 16—Introduction to the Theatre; 114—The Film as an Art Form. PHILOSOPHY COURSES: 1—Introduction to Philosophy; 41—Elementary Logic and Semantics; 45—Ethics; 52—Philosophy in Literature; 53—Philosophy of Religion; 147—Philosophy of Art; 152—Philosophy of History; 154—Political and Social Philosophy.

In *History* (6 hours), the student is required to distribute his work between United States and non-United States fields, with three hours in each. Recommended courses in United States History are: 21—History of the United States to 1865; 22—History of the United States since 1865; 23—Social and Cultural History of Early America; 24—Social and Cultural History of Modern America; or 29—The United States in World Affairs. For the exceptionally well-prepared student, however, 100-level (junior or senior) courses which have no prerequisite are also available. In non-United States History, recommended courses are: 31 or 32—Latin American History; 41 or 42—Western Civilization; 51 or 52—The Humanities; 53 or 54—History of England and Great Britain; 61 or 62—Far Eastern Civilization; or 71 or 72—Islamic Civilization. Here also the well-prepared student may use non-prerequisite courses at the 100 level to satisfy the requirement.

In *Mathematics* (3 hours), any course carrying credit of three or more hours for which the student is eligible will satisfy this University requirement. (Note, however, that some curricula require higher-numbered sequences than those for which the student is eligible at the time of his admission; while other sequences may be open *only* to students registered in specified curricula.) Students in science curricula will usually satisfy this requirement automatically.

In *Science* (7 hours), students are required to take one course in a physical science and one course in a biological science; one of these must be a laboratory (4-hour) course. The physical sciences for this purpose are Astronomy, Chemistry, Geology, and Physics; biological sciences are Botany, Entomology, Microbiology, and Zoology. Students whose curricula include seven or more hours of physical or biological science are not required to take additional courses to meet this distribution requirement. The non-science student may register for a basic course or any higher course for which he is eligible (by placement, prerequisite, and class standing).

In *Social Science* (6 hours), two courses may be chosen from five fields: Anthropology 1—Introduction to Anthropology; Economics 31—Principles of Economics, or Economics 37—Fundamentals of Economics; Government and Politics 1—American Government, or Government and Politics 3—Principles of Government and Politics; Psychology 1—Introduction to Psychology; or Sociology 1—Introduction to Sociology.

2. It should be emphasized that the 34 semester hours of General Education courses constitute a University requirement, applicable to all students receiving a Bachelor's degree from the University of Maryland. Individual Colleges within the University may add to, though they may not reduce, these requirements. For example, students in the College of Arts and Sciences pursuing a B.A. or B.S. degree are required to take a total of twelve hours of Mathematics and Science. Different curricula may specify one or more courses among the options. For example, students in the pre-medical program must offer Philosophy 1 to satisfy the Fine Arts requirement.

3. In certain of the six fields, the student's level of placement (by examination or departmental evaluation) may modify the requirement. In History, students with unusually good high school preparation (as indicated by placement tests) may satisfy the requirement with two courses in the non-United States field, if they wish.

In general, appropriate Honors or pre-Honors courses may replace General Education courses, for eligible students. For example, students with high placement scores in English may substitute Engl. 21 (Honors Composition) for the ordinary requirement of Engl. 1. Honors and pre-Honors equivalents for General Education courses are specified in the several college catalogs.

4. The General Education Program is designed to be spread out over the four years of college. No General Education course requires credit in any prior college course as a prerequisite. Thus, a student may (within limits of his particular curriculum) satisfy a General Education requirement in each category with any designated course for which he is eligible by placement examination, department evaluation, and class standing. Most courses numbered 1 to 10 may be taken by freshmen; most courses between 11 and 99 require sophomore (or honors) standing. Courses at the 100 level are normally for juniors or seniors: that is, they require that a student have earned 56 hours of college credit while in good academic standing. Exceptions are as explicitly stated in the catalogs of the several colleges.

## ACADEMIC INFORMATION

**SPECIAL NOTE FOR FOREIGN STUDENTS.** The foreign student is required to take a special classification test in English before registering for the required English courses. He may be required to take Foreign Language 1 and 2—English for Foreign Students—*before* registering for English 1.

**PHYSICAL EDUCATION.** All undergraduate men and women students who are registered for more than eight semester hours of credit are required to enroll in and successfully complete two prescribed courses in physical education for a total of two semester hours of credit. The successful completion of these courses is required for graduation. These courses must be taken by all eligible students during the first two semesters of attendance at the University, whether they intend to graduate or not. Men and women who have reached their thirtieth birthday are exempt from these courses. The thirtieth birthday must precede the Saturday of registration week. Students who are physically disqualified from taking these courses must enroll in adaptive courses for which credit will be given. A transferring student who can meet the academic requirements of his college and the requirements of the University by completing 30 academic hours will not be required to register for physical education. Students with military service may receive credit for these courses by applying to the Director of the Men's Physical Education Program. Students majoring or minoring in physical education, recreation, or health education may meet these requirements by enrolling in special professional courses.

**HEALTH EDUCATION.** All freshmen students are required to complete satisfactorily one semester of Health Education (Hea. 5) for graduation. Students who have reached their thirtieth birthday are exempt from this requirement. Transfer students who do not have credit in this course, or its equivalent, must complete this requirement.

**IMPLEMENTATION.** The requirements of the General Education Program apply to students who enrolled for the first time in college on or after June 22, 1964. Students who began college work prior to that time will refer to descriptions of the American Civilization Program in earlier published College catalogs or in *University General and Academic Regulations*. Questions about any aspect of the program may be addressed to the advisers, college deans, or the Director of General Education.

### *College Requirements*

1. **FOREIGN LANGUAGE.** Students in the College of Arts and Sciences must follow one of the following options in foreign language:

- a. They may take twelve semester hours in a classical language.
- b. Students who begin a modern foreign language in the University must successfully complete the study of that language in any authorized sequence, through Course 7 in all languages or Course 8 in German.
- c. Students who continue in the University a language studied for two or more years in secondary school may choose, in French,

German, or Spanish, between enrollment in Course 5 or the taking of a placement examination<sup>3</sup> (students beginning in Courses 5, 6, or 7 must continue in any authorized sequence through Course 7 plus three additional hours; those beginning a course higher than Course 7 must take a total of six hours in the appropriate courses). In modern languages other than French, German, or Spanish (i.e., languages which do not have a Course 5), all students must take a placement examination.<sup>3</sup>

The languages which may be offered to meet this requirement are Chinese, French, German, Greek, Hebrew, Italian, Latin, Russian, and Spanish.

German 9 may not be taken to meet the College requirement of 12 hours of language unless the student has finished German 7 or German 8. Students who wish to offer a foreign language not included in this list should consult the Head of the Foreign Language Department for a recommendation to the Dean.

Foreign students may satisfy this requirement by offering twelve hours of English in addition to the regular English requirement. The special course in English for foreign students (Foreign Language 1, 2) may be included in the additional hours of English. (This option may not be used by pre-medical students.) A foreign student may not meet the foreign language requirement by taking freshman or sophomore courses in his native language.

Normally a student shall not be permitted to repeat a foreign language course below Course 9 for credit if he has successfully completed a higher numbered course than the one he wishes to repeat.

2. **NATURAL SCIENCE AND MATHEMATICS.** Twelve semester hours are required, except for candidates for the Bachelor of Music degree (who must satisfy the minimum General Education requirement, however). The science courses elected require the approval of the Dean; departments in which courses may be selected are the same as those listed under the General Education requirement (pp. 4-5).

3. **SPEECH.** Normally, students in the arts area take speech 1 (3 hours), while those in the science area take Speech 7 (2 hours). In certain specialized programs other courses may be required. The foreign student should register for Speech 3—Fundamentals of General American Speech—rather than for the speech course normally required in his curriculum.

4. **MAJOR AND MINOR REQUIREMENTS.** Specific descriptions of the departmental, inter-departmental, or pre-professional majors are found, in alphabetical order, along with the course offerings in the second section of this

---

<sup>3</sup> A placement test is given during registration week for students wishing to pursue a modern language they have studied in high school.

## ACADEMIC INFORMATION

catalog. The general College regulations controlling majors (and minors) are as follows.

During his sophomore year, each student should choose a field of concentration (major). He may make this choice as early as he wishes; however, once he has earned 56 hours of acceptable credit he *must* choose a major before his next registration.

In the program leading to the B.A. degree, the student must also have a secondary field of concentration (minor). The courses constituting the major and the minor must conform to the requirements of the department in which the major work is done.

The student must have an average of not less than "C" in the introductory courses in the field in which he intends to major.

A major shall consist, in addition to the underclass departmental requirements, of 24-40 hours, of which at least twelve must be in courses numbered 100 or above, and at least twelve of which must be taken in the University of Maryland.

A minor in programs leading to the B.A. degree shall consist of a coherent group of courses totaling 18 semester hours in addition to the requirements listed above. At least six of the 18 hours must be in a single department in courses numbered 100 or above. The courses comprising the minor must be chosen with the approval of the major department. Except in certain specialized curricula approved by the Dean, not more than nine hours of the minor may be taken in courses outside of the College of Arts and Sciences.

No minor is required in programs leading to the B.S. degree, but the student must take supporting courses in science or other fields as specified by his major department.

The average grade of the work taken for the major must be at least "C"; some departments will count toward satisfaction of the major requirement no course completed with a grade of less than "C." The average grade of the work taken in the major and minor combined must be at least "C." A general average of "C" in courses taken at the University of Maryland is required for graduation.

Courses taken to fulfill the requirements in General Education may not be used toward major or minor requirements.

### *Junior Requirements*

To attain junior standing, a student must acquire a minimum of 56 academic semester hours with an average grade of at least "C" in the freshman and sophomore years. See *University General and Academic Regulations* for full statement of rules pertaining to junior standing.

### *Normal Load*

The normal load for students in this college is 15 semester hours credit per semester, exclusive of the required work in physical activities and health.

A student must have the approval of his adviser and dean to take more than the normal program prescribed in his curriculum.

### *Advisers*

Each freshman in this College will be assigned to a faculty adviser who will help the student, during his first year, to select his courses and to determine what his field of major concentration should be.

The student at the sophomore level and above will be advised by a faculty member in his major department. Students following the three-year programs in Dentistry, Law, and Medicine will be advised by special advisers for these programs.

### *Electives in Other Schools and Colleges*

A limited number of courses taken in other colleges and schools of the University may be counted for elective or minor credit toward a degree in the College of Arts and Sciences. The number of credits which may be accepted from the various colleges and schools is as follows: College of Education—24; all other colleges or independent departments—20. The combined credits from other colleges and schools shall not exceed 20 (or 24 if courses in education are included). For the combined degree programs in Dentistry, Law, or Medicine the first year of professional work must be completed.

### *Air Science*

Starting in September 1965, the Department of Air Science will offer two all-voluntary programs in Air Force ROTC at the University of Maryland. Successful completion of either the 2-year or the 4-year program qualifies a student for a commission in the United States Air Force upon graduation. No Air Science course under the 100 level may be included in the 120 hours required for graduation.

Selected students who wish to do so may, with proper approval, carry Advanced Air Science courses as electives during their junior and senior years. Financial assistance is provided for students in the Advanced program. Specific information on either the two-year or the four-year program is included in the *University General and Academic Regulations*.

### *Certification of High School Teachers*

If courses are properly chosen in the field of education, a prospective high school teacher can prepare for high school positions, with a major

## ACADEMIC INFORMATION

and minor in one of the departments of this College. A student who wishes to work for a teacher's certificate must consult his adviser before his junior year. Such a student should, at the same time, consult an adviser in the appropriate curriculum in the College of Education.

### *Honors*

The Honors Program of the College is made up of the Departmental Honors Program and the General Honors Program. The over-all aim of the College Honors Program is to recognize and encourage superior scholarship. Its more particular aim is to provide qualified students with a maximum opportunity for intensive and often independent study.

1. The General Honors Program is administered by the Director of the Arts and Sciences Honors Programs and by the College Honors Committee which also acts as an advisory and regulatory body for all Honors Programs within the College. Admission to the General Honors Program shall ordinarily be at the beginning of the first or second semester of the student's freshman year. Students are selected on the basis of American College Test scores, rank in high school, and several other factors dealing with academic prowess in high school. Students in the General Honors Program are offered a variety of special sections and special courses in all of their freshman subjects. The classes are as small as possible and the instruction allows for a more intensive analysis of the material.

2. The Departmental Honors Program is administered by an Honors Committee within each department. Admission to the Departmental Honors Program shall ordinarily be at the beginning of the first or second semester of the student's junior year. As a rule, only students with a cumulative grade point average of at least 3.0 will be admitted. A comprehensive examination over the field of his major program is given to a candidate near the end of his senior year. On the basis of the student's performance on the Honors Comprehensive Examination and in meeting such other requirements as may be set by the Departmental Honors Committee, the faculty may vote to recommend the candidate for the appropriate degree (B.A., B.Mus., or B.S.) without departmental honors; for the appropriate degree with (departmental) HONORS; or for the appropriate degree with (departmental) HIGH HONORS. Successful candidacy will be symbolized by appropriate announcement in the Commencement Program and by citation on the student's academic record and diploma.

Students in the General and Departmental Honors Programs enjoy some academic privileges similar to those of graduate students.

# Programs and Course Offerings

COURSES NUMBERED FROM 1 TO 99 ARE OPEN TO UNDERGRADUATE STUDENTS who meet the stated prerequisite and curriculum requirements.

Courses numbered from 100 to 199 are open to juniors and seniors with the stated prerequisites. Under some conditions, second-semester sophomores may register for 100-level courses with Dean's approval. Graduate students may take 100-level courses for credit, subject to departmental and Graduate School regulations.

Courses numbered 200 and above are for graduate students only, except in exceptional cases approved by the Dean of Arts and Sciences and the Dean of the Graduate School.

## AMERICAN STUDIES

*Committee on American Studies:* Associate Professor Beall, *Executive Secretary.*

*Professors:* GIFFIN, HOFFSOMMER, MURPHY AND PLISCHKE.

American Studies is a major program leading to a B.A. degree; it also provides for graduate work on the M.A. and Ph.D. level.

The student who majors in American Studies has the advantage of being taught by cooperating specialists from various departments. The student majoring in American Studies will obtain his courses principally from the offerings of the Departments of English, History, Government and Politics, and Sociology. In planning a curriculum, the student is required to concentrate in one of the four departments. The program must include 42 semester hours of work from the departments participating in the program. These credits constitute collectively a major and a minor. At least 20 of these 42 hours must be in 100-level courses. The work should be so distributed that the student will take at least nine hours in each of three of the four cooperating departments, including the department of his concentration. No course with a grade less than "C" may be used to satisfy major requirements.

In his junior year, each major student is required to take American Studies 127, 128—Culture and the Arts in America. In his senior year, each major student is required to take a conference course, American Studies 137, 138, in which the study of American civilization is brought to a focus. During the course, the student analyzes eight or ten important books which reveal fundamental patterns in American life and thought and receives incidental training in bibliographic matters, in formulating problems for special investigation, and in group discussion.

Freshmen who are interested in this program should consult with their lower division adviser. Upperclassmen should consult with the Executive Secretary of the American Studies curriculum, Associate Professor Beall.

## ART

Suggested sample curriculum for American Studies majors:

Junior year: American Studies 127, 128—Culture and the Arts in America (3, 3); Hist. 52—The Humanities (3); Hist. 105, 106—Social and Economic History of the United States (3, 3); Engl. 150, 151—American Literature (3, 3); G. & P. 144—American Political Theory (3); and electives (9).

Senior year: American Studies 137, 138—Conference course in American Studies (3,3); G. & P. 174—Political Parties (3); Phil. 105—Philosophy in America (3); Anth. 105—Cultural Anthropology (3); Anth. 125—Cultural History of the Negro (3); Hist. 133, 134—History of Ideas in America (3, 3); and electives (6).

AMER. STUD. 127, 128. CULTURE AND THE ARTS IN AMERICA. (3, 3)

Prerequisite, junior standing. A study of American institutions, the intellectual and aesthetic climate from the colonial period to the present.

AMER. STUD. 137, 138. CONFERENCE COURSE IN AMERICAN STUDIES. (3, 3)

Four American classics (drawn from fields of the Department of English, Government and Politics, History, and Sociology, which cooperate in the program) are studied each semester. Specialists from the appropriate departments lecture on these books. Through these books and the lectures on them, the student's acquaintance with American culture is brought to a focus.

### *For Graduates*

AMER. STUD. 201, 202. SEMINAR IN AMERICAN STUDIES. (3, 3)

(Beall)

AMER. STUD. 399. THESIS RESEARCH. (1-6)

## ART

*Professor and Head:* LEVITINE.

*Professors:* LEMBACH AND MARIL.

*Associate Professor:* DE LEIRIS.

*Assistant Professors:* DENNY, GROSSMAN, GRUBAR, JAMIESON, LONGLEY, O'CONNELL, STITES.

*Lecturer:* O'CONNOR.

*Instructors:* FREENY AND SULLIVAN.

Two majors are offered in Art: Art History and Studio. The major in Art History is committed to the study and scholarly interpretation of existing works of art, from the prehistoric era to our times, while the Studio major stresses the student's direct participation in the creation of works of art.

In spite of this difference, both majors are rooted in the concept of art as a humanistic experience, and share an essential common aim: the development of aesthetic sensitivity, understanding, and knowledge. For this reason, students in both majors are required to progress through a "common curriculum," which will ensure a broad grounding in both aspects of art; then each student will move into a "specialized curriculum" with advanced courses in his own major. Maximum allowable credits in either major is 42.

### COMMON CURRICULUM:

Art 10, Introduction to Art (3); Art 12, Design I (3); Art 16, Drawing I (3); and Art 60 and 61, History of Art (3, 3).

### SPECIALIZED CURRICULUM:

*Art History major:* Art 80, History of American Art (3); four courses in over 100 level in History of Art (12). In addition, one advanced course in Studio work is required. Total credits for Art History major: 33.

*Studio major:* Art 17, Painting I (3); Art 26, Drawing II (3); Art 118, Sculpture I (3); Art 119, Printmaking I (3); Art 126, Drawing III (3); plus one course at the 100 level (3). In addition, one advanced course in Art History is required. Total credits for Studio major: 36.

No course with a grade less than "C" may be used to satisfy major requirements.

#### ART 10. INTRODUCTION TO ART. (3)

Basic tools of understanding visual art. This course stresses major approaches such as techniques, subject matter, form, and evaluation. Architecture, sculpture, painting, and graphic arts will be discussed. Required of all Art Majors in the first year. (Levitine, Staff)

#### ART 12. DESIGN I. (3)

Six hours per week. Prerequisite or concurrent registration, Art 10. Principles and elements of design including basic composition, line, color theory, perspective, and three-dimensional space. (Staff)

#### ART 16. DRAWING I. (3)

Six hours per week. Prerequisite or concurrent registration, Art 10. An introductory course with a variety of media and related techniques. Problems based on still life, figure, and nature. (Staff)

#### ART 17. PAINTING I. (3)

Six hours per week. Prerequisites, Art 10, 12, 16. Basic tools and language of painting. Oil and watercolor. (Grossman, Maril, Staff)

#### ART 26. DRAWING II. (3)

Six hours per week. Prerequisites, Art 10, 12, 16. Original compositions from the figure and nature, supplemented by problems of personal and expressive drawing. (Staff)

## ART

### ART 27. ARCHITECTURAL PRESENTATION. (3)

Six hours per week. Prerequisites, Art 10, 12, 16. Technique of wash and watercolor in architectural, interior, and landscape architectural rendering. (Stites)

### ART 40. FUNDAMENTALS OF ART EDUCATION. (3)

Two hours of laboratory and two hours of lecture per week. Fundamental principles of the visual arts for teaching on the elementary level. Elements and principles of design and theory of color. Studio practice in different media. (Lembach, Longley)

### ART 60, 61. HISTORY OF ART. (3, 3)

A survey of western art as expressed through architecture, sculpture and painting. First semester, prehistoric times to Renaissance; second semester, from Renaissance to the present. (Staff)

### ART 65, 66. MASTERPIECES OF PAINTING. (3, 3)

Prerequisite, Sophomore standing. A study of the contributions of a few major painters, ranging from Giotto to Picasso. (Levitine, Staff)

### ART 67, 68. MASTERPIECES OF SCULPTURE. (3, 3)

Prerequisite, Sophomore standing. A study of the contributions of a few major sculptors, ranging from Polykleitos to Moore. (Levitine, Staff)

### ART 70, 71. MASTERPIECES OF ARCHITECTURE. (3, 3)

Prerequisite, Sophomore standing. A study of great architecture from Stonehenge to Dulles Airport. (Stites)

### ART 80. HISTORY OF AMERICAN ART. (3)

Architecture, sculpture and painting in the United States from the Colonial period to the present. This course may be elected under Group II of the American Civilization program by students who first registered prior to June 22, 1964. (Grubar)

### ART 117. PAINTING II. (3)

Six hours per week. Prerequisites, Art 17, 26. Original compositions based upon nature, figure, and still life, supplemented by expressive painting. Choice of media. Different sections of course may be taken for credit.

117-a. Oil painting and related media. (Maril)

117-b. Watercolor and casein. (Grossman)

117-c. Plastic media, such as encaustic and ploymer tempera. (Jamieson)

117-d. Mural painting. The use of contemporary synthetic media. (Jamieson)

### ART 118. SCULPTURE I. (3)

Six hours per week. Prerequisite, Art 26. (For students majoring in Art History, by permission of Department.) Volumes, masses, and planes, based on the use of plastic earths. Simple armature construction and methods of casting. Laboratory Fee \$15.00. (Freeny)

### ART 119. PRINTMAKING I. (3)

Six hours per week. Prerequisite, Art 26. (For students majoring in Art History, by permission of Department.) Basic printmaking technique in relief, intaglio, and planographic media. Laboratory Fee \$20.00. (O'Connell)

**ART 126. DRAWING III. (3)**

Six hours per week. Prerequisite, Art 26. Emphasis on understanding organic form, as it is related to study from the human figure and to pictorial composition. (Jamieson)

**ART 127. PAINTING III. (3)**

Six hours per week. Prerequisite, Art 117. Creative painting for advanced students. Problems require a knowledge of pictorial structure. Development of personal direction. Choice of media. (Grossman, Maril)

**ART 128. SCULPTURE II. (3)**

Six hours per week. Prerequisite, Art 118. Different sections of course may be taken for credit.

- 128-a. Nature as a point of reference with potentiality of developing ideas into organic and architectural forms. Laboratory Fee \$15.00. (Freeny)
- 128-b. May be taken after 128-a. Problems involving plastic earths and other material capable of being modeled or cast. Choice of individual style encouraged. (Freeny)

**ART 129. PRINTMAKING II. (3)**

Six hours per week. Prerequisite, Art 119. One print media including extensive study of color processes. Individually structured problems. Laboratory Fee \$20.00. (O'Connell)

**ART 137. PAINTING IV. (3)**

Six hours per week. Prerequisite, Art 127. Creative painting. Emphasis on personal direction and self-criticism. Group seminars. (Grossman, Jamieson, Maril)

**ART 138. SCULPTURE III. (3)**

Six hours per week. Prerequisite, Art 128. Problems and techniques of newer concepts, utilizing various materials, such as plastics and metals. Technical aspects of welding stressed. (Freeny)

**ART 139. PRINTMAKING III. (3)**

Six hours per week. Prerequisite, Art 129.

- 139-a. Contemporary experimental techniques of one print medium with group discussions. (O'Connell)
- 139-b. Continuation of 139-a. May be taken for credit after 139-a. (O'Connell)

**ART 160, 161. CLASSICAL ART. (3, 3)**

Architecture, sculpture and painting in the Classical cultures. First semester will stress Greece; second semester, Rome. (Staff)

**ART 162, 163. ART OF THE EAST. (3, 3)**

Architecture, sculpture and painting. First semester will stress India; second semester, China and Japan. (Staff)

**ART 164. EARLY CHRISTIAN AND BYZANTINE ART. (3)**

Architecture, sculpture, painting, and mosaic of early Christian Rome, the Near East, and the Byzantine Empire. (Staff)

## ART

### ART 166, 167. MEDIEVAL ART. (3, 3)

Architecture, sculpture and painting in the Middle Ages. First semester will stress Romanesque; second semester, the Gothic period. (Denny)

### ART 168, 169. RENAISSANCE ART IN ITALY. (3, 3)

Architecture, sculpture and painting from 1400 to the High Renaissance in the 16th century. (O'Connor)

### ART 170. NORTHERN EUROPEAN PAINTING IN THE 15TH AND 16TH CENTURIES. (3)

Painting in Flanders and related northern European areas, from Van Eyck to Brueghel and Durer. (Denny)

### ART 172, 173. EUROPEAN BAROQUE ART. (3, 3)

Architecture, sculpture and painting of the major European centers in the 17th century. (De Leiris)

### ART 174, 175. FRENCH PAINTING. (3, 3)

French painting from the 15th through the 18th century, from Fouquet to David. (Levitine)

### ART 176, 177. 19TH CENTURY EUROPEAN ART. (3, 3)

Architecture, sculpture and painting in European Art from Neo-Classicism to Impressionism. (De Leiris)

### ART 178, 179. 20TH CENTURY ART. (3, 3)

Architecture, sculpture and painting from the late 19th century to our day. (O'Connor)

### ART 192, 193. DIRECTED STUDIES IN STUDIO ART. (2 or 3, 2 or 3)

For advanced students, by permission of Department Head. Course may be repeated for credit if content differs. (Staff)

### ART 194, 195. DIRECTED STUDIES IN ART HISTORY. (2 or 3, 2 or 3)

For advanced students, by permission of Department Head. Course may be repeated for credit if content differs. (Staff)

### *For Graduates*

The requirements of students will determine which courses will be offered.

### ART 200, 201. PAINTING. (3, 3)

Specific projects to be developed. Conferences arranged. (Grossman, Jamieson, Maril)

### ART 202, 203. PAINTING. (3, 3)

Individual projects growing in complexity. Seminars. (Grossman, Jamieson, Maril)

### ART 211. PRINTMAKING. (3)

Advanced problems. Relief process. (O'Connell)

### ART 212. PRINTMAKING. (3)

Advanced problems. Intaglio process. (O'Connell)

- ART 213. PRINTMAKING. (3)  
Advanced problems. Lithographic process. (O'Connell)
- ART 214. SEMINAR IN PRINTMAKING. (3)  
(O'Connell)
- ART 221, 222. EXPERIMENTATION IN SCULPTURE. (3, 3)  
Independent research stressed. (Freeny)
- ART 223. MATERIALS AND TECHNIQUES IN SCULPTURE. (3)  
For advanced students. Methods of armature building, casting, and the use of a variety of stone, wood, metal, and plastic materials. (Freeny)
- ART 224. SCULPTURE—CASTING AND FOUNDRY. (3)  
The traditional methods of plaster casting and the more complicated types involving metal. *Cire perdue*, sandcasting and newer methods such as cold metal process. (Freeny)
- ART 226. DRAWING. (3)  
Sustained treatment of a theme chosen by student. Wide variety of media. (Jamieson)
- ART 227. DRAWING. (3)  
Traditional materials and methods including Oriental, Sumi ink drawing and techniques of Classical European masters. (Jamieson)
- ART 228. DRAWING. (3)  
Detailed anatomical study of the human figure and preparation of large scale mural compositions. (Jamieson)
- ART 229. DRAWING AND PAINTING. (3)  
Preparation and execution of a wall decoration. (Jamieson)
- ART 240, 241. ADVANCED PROBLEMS IN ART EDUCATION. (3, 3)  
An integrated series of problems determined by the student's professional needs. (Lembach)
- ART 250. AMERICAN COLONIAL ART. (3)  
The arts during the exploration period and Colonial development. (Grubar)
- ART 255. SEMINAR IN 19TH CENTURY AMERICAN ART. (3).  
Problems in architecture, sculpture and painting from the end of the Colonial period until 1860. (Grubar)
- ART 261. SEMINAR IN ROMANTICISM. (3)  
Problems derived from the development of Romantic Art during the 18th and 19th centuries. (Levitine)
- ART 263. SEMINAR IN 19TH CENTURY EUROPEAN ART. (3)  
Problems derived from the period starting with David and ending with Cezanne. (De Leiris)
- ART 266. SEMINAR IN CONTEMPORARY ART. (3)  
Problems of Western art from 1900 to the present. (O'Connor)

## ASTRONOMY

- ART 268. SEMINARY IN LITERARY SOURCES OF ART HISTORY. (3)  
Art historical sources from Pliny to Malraux. (Levitine)
- ART 292, 293. DIRECTED GRADUATE STUDIES IN STUDIO ART. (3, 3)  
For advanced graduate students by permission of Head of Department. Course may be repeated for credit if content differs. (Staff)
- ART 294, 295. DIRECTED GRADUATE STUDIES IN ART HISTORY. (3, 3)  
For advanced graduate students, by permission of Head of Department. Course may be repeated for credit if content differs. (Staff)
- ART 399. THESIS RESEARCH. (1-6)

## ASTRONOMY

*Professor and Head:* LASTER.

*Professor and Director of Astronomy:* WESTERHOUT.

*Professors:* MUSEN (P.T.) AND OPIK.

*Associate Professors:* ERICKSON, SMITH AND VAN WIJK.

*Assistant Professor:* BELL.

*Lecturer:* CHOU (P.T.)

The requirements for a major in Astronomy are designed to provide a solid background in related fields and a broad program of study in the fundamentals of Astronomy. The program is designed to prepare students for graduate work as well as for positions in governmental and industrial laboratories and observatories.

Students who enter the University intending to major in Astronomy are urged to take during the first two years the same introductory physics and mathematics courses recommended for physics majors (see requirements for physics majors). If their schedule permits they should also take the introductory astronomy course Astr. 1, 2—or Astr. 10—(3). Alternatively, Astr. 10 may also be taken during the fall term of the junior year.

In addition, astronomy majors are required to take the following courses: Phys. 127, 128—Elements of Mathematical Physics (4, 4); Astr. 100—Observational Astronomy (3) and one other astronomy course at the 100 level; and one 3-credit mathematics course approved by the department adviser (which is usually Math. 110—Advanced Calculus, or Math. 162—Applied Mathematics I).

Recommended course programs are available from the Department of Physics and Astronomy. Students may major in Astronomy only if a grade "C" is attained in each semester of the elementary physics and astronomy courses and in each of the required mathematics courses.

Students who wish to be recommended for graduate work must maintain a "B" average and should take as many as possible of the following courses: one additional astronomy course at the 100 level, Phys. 118, 119—Modern Physics (3, 3), and Phys. 120—Nuclear Physics (4), or Phys. 116—Fundamental Hydrodynamics (3), and at least two additional mathematics courses, usually Math. 114—Differential Equations (3), and Math. 111—Advanced Calculus (3), or Math. 116—Complex Variables, or Math. 130—Probability (3).

**HONORS IN ASTRONOMY:** The honors program offers to students of exceptional ability and interest in astronomy an educational program with a number of special opportunities for learning. Honors sections are offered in several courses, and there are many opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study; and certain graduate courses are open for credit toward the bachelor's degree.

Students for the Honors Program are accepted by the Department's Honors Committee on the basis of recommendations from their advisers and other faculty members. A final written and oral comprehensive examination in the senior year concludes the program which may lead to graduation "with Honors (or High Honors) in Astronomy."

#### ASTR. 1. INTRODUCTION TO ASTRONOMY. (3)

Every semester. An elementary course in descriptive astronomy, especially appropriate for non-science students. Coordinates, time, sun, moon, planets, stars and nebulae, galaxies, evolution. The course is illustrated with slides and demonstrations of instruments. Lecture demonstration fee \$3.00

(Smith, Chou)

#### ASTR. 2. INTRODUCTION TO MODERN ASTRONOMY. (3)

Spring semester. Three lectures per week. Prerequisite, Astr. 1. An elementary course in modern astronomy elaborating on some of the topics which could only be mentioned briefly in Astronomy 1. Appropriate for non-science students. Lecture demonstration fee \$3.00

(Smith)

#### ASTR. 5. ASTRONOMY LABORATORY. (1)

Fall and spring semesters. Two hours of Laboratory per week. Prerequisite, previous or concurrent enrollment in Astr. 1 or 10. Laboratory fee \$10.00. Exercises in the use of celestial coordinates, measurement of position, determination of time of day and night; study of photographs of stars, nebulae and galaxies, and spectra; photoelectric photometry; demonstration of astronomical instruments, daytime and nighttime observations if weather permits. Appropriate for non-science majors.

(Van Wijk)

#### ASTR. 10. DESCRIPTIVE AND ANALYTICAL ASTRONOMY. (3)

Fall semester. Three lectures per week. A general survey course intended for science majors. Prerequisite, concurrent or previous enrollment in Math. 20. This introductory course will deal with the sun and the solar system, stars and astro-physics, stellar systems and cosmology. It should not be taken by students who have already taken Astr. 1 and 2. Lecture demonstration fee \$3.00.

(Van Wijk, Erickson)

## ASTRONOMY

### ASTR. 100. OBSERVATIONAL ASTRONOMY. (3)

Second semester. Two lectures and two hours of laboratory work per week. Prerequisite, Math 21 and at least 12 credits of introductory physics and astronomy courses. Laboratory fee, \$10. Introduction to the methods of astronomical photometry and spectroscopy. (Van Wijk)

### ASTR. 101. INTRODUCTION TO GALACTIC RESEARCH. (3)

First semester. Three lectures per week. Prerequisite, Math 21 and at least 12 credits of introductory physics and astronomy courses. Stellar motions, methods of galactic research, study of our own and nearby galaxies, clusters of stars. (Van Wijk)

### ASTR. 102. INTRODUCTION TO ASTROPHYSICS. (3)

Second semester. Three lectures per week. Prerequisite, previous or concurrent enrollment in Physics 119 or consent of the instructor. Spectroscopy, structure of the atmospheres of the sun and other stars. Observational data and curves of growth. Chemical composition. (Bell)

### ASTR. 110. INTRODUCTION TO RADIO ASTRONOMY. (3)

Three lectures per week. Prerequisite, Math 21 and at least 12 credits of introductory physics and astronomy courses. Characteristics of extraterrestrial radio noise, sources of radio emission, our own and external galaxies, the sun, radio telescopes, and basic observational techniques. (Westerhout)

### ASTR. 124. CELESTIAL MECHANICS. (3)

Three lectures a week. Prerequisite, Physics 127 or consent of instructor. Celestial mechanics, orbit theory, equations of motion. (Musen)

### ASTR. 150. SPECIAL PROBLEMS IN ASTRONOMY.

Given each semester. Prerequisite, major in physics or astronomy and/or consent of adviser. Research or special study. Credit according to work done. (Staff)

### ASTR. 190. HONORS SEMINAR.

Credit according to work done, each semester. Enrollment is limited to students admitted to the Honors Program in Astronomy. (Staff)

### ASTR. 200. DYNAMICS OF STELLAR SYSTEMS. (3)

First semester. Three lectures per week. Prerequisite, Physics 200 or Astr. 101. Theory of stellar encounters. Study of the structure and evolution of dynamical systems encountered in astronomy. (Van Wijk)

### ASTR. 202. STELLAR INTERIORS. (3)

Three lectures per week. Prerequisites, Math 114 and Physics 119 or consent of instructor. A study of stellar structure and evolution. (Bell)

### ASTR. 203. STELLAR ATMOSPHERES. (3)

Three lectures per week. Prerequisite, Physics 212 or consent of the instructor. Observational methods, line formation, curve of growth, equation of transfer, stars with large envelopes, variable stars, novae, magnetic fields in stars. (Bell)

**ASTR. 204. PHYSICS OF THE SOLAR SYSTEM. (3)**

Three lectures per week. Prerequisite, Physics 119. A survey of the problems of interplanetary space, planetary structure and atmosphere, physics of the earth's upper atmosphere, motions of particles in the earth's magnetic field.

(Opik)

**ASTR. 210. GALACTIC RADIO ASTRONOMY. (3)**

Three lectures per week. Prerequisites, Physics 119, Astr. 101 and 110 or consent of the instructor. Theory and observations of the continuum and 21 cm line emission from the Galaxy; galactic structure and the sources of radio emission.

(Westerhout)

**ASTR. 212. PHYSICS OF THE SOLAR ENVELOPE. (3)**

Three lectures per week. Prerequisites, Physics 119, Astr. 102 and 110 or consent of the instructor. Physics of solar phenomena, such as solar flares, structure of the Corona and the Chromosphere; radio emission from the sun.

(Erickson)

**ASTR. 214. INTERSTELLAR MATTER. (3)**

Three lectures per week. Prerequisites, previous or concurrent enrollment in Physics 213, Astr. 101 or Astr. 102 or consent of instructor. A study of the physical properties of interstellar gas and dust.

(Smith)

**ASTR. 230. SEMINAR. (1)**

Seminars on various topics in advanced astronomy are held each semester, with the contents varied each year. One credit for each seminar each semester.

(Staff)

**ASTR. 248, 249. SPECIAL TOPICS IN MODERN ASTRONOMY.**

Credit according to work done each semester. Prerequisite, consent of instructor.

(Staff)

**ASTR. 399. RESEARCH.**

Credit according to work done, each semester. Laboratory fee, \$10 per credit hour. Prerequisite, an approved application for admission to candidacy or special permission of the Department of Physics and Astronomy.

(Staff)

## BOTANY

Botany is recognized as either a major or minor field in Arts and Sciences, leading to the B.S. (and with some majors the B.A.) degree. The Botany Department is administered by the College of Agriculture, but students register for botany courses and major or minor in this subject just as if the Department were in the College of Arts and Sciences.

Freshmen should consult their lower division adviser and also the Botany Department adviser in planning the major program. The four lower division courses, Bot. 1, 2—General Botany; Bot. 20—Diseases of Plants; and Bot. 11—Plant Taxonomy (total 15 credit hours) should be taken during the first two years. Sufficient upper division courses to give a total of 36 credit hours in botany must be taken. Included in these will be Bot. 101—

## CHEMICAL PHYSICS AND CHEMISTRY

Plant Physiology; Bot. 110—Plant Microtechnique; Bot. 111—Plant Anatomy; Bot. 102—Plant Ecology; Bot. 117—General Plant Genetics; and electives.

The botany electives chosen depend in part on the student's chief interest. To support the courses in botany, major students are required to take Chem. 1, 3—General Chemistry; Math. 10, 11—Introduction to Mathematics (or Math. 18, 19) as a minimum; Phys. 10, 11—Fundamentals of Physics; Zool. 1—General Zoology; Microb. 1—General Microbiology; and 12 hours of a modern language, preferably German. Chem. 31, 33—Organic Chemistry; and Math. 14, 15—Calculus, are strongly recommended. Other courses to meet the requirements of the major are to be chosen with the aid of a faculty adviser. Descriptions of courses in botany will be found in the catalog of the College of Agriculture. Additional information about the curriculum in botany may be obtained at the departmental office.

## CHEMICAL PHYSICS

(See Molecular Physics, p. 88.)

## CHEMISTRY

Laboratory fees in chemistry are \$12.00 per laboratory course per semester except for Chemistry 270, for which the fee is \$20.00.

*Professor and Head:* WHITE.

*Professors:* JAQUITH, LIPPINCOTT, MASON,<sup>4</sup> PRATT, PURDY, REEVE, ROLINSON, SVIRBELY, VANDERSLICE,<sup>4</sup> VEITCH AND WOODS.

*Research Professor:* BAILEY.

*Associate Professors:* ATKINSON, GORDON, GRIM, HENERY-LOGAN, KASLER, PICKARD, STEWART AND STUNTZ.

*Assistant Professors:* BELLAMA, BOYD, CARRUTHERS, HUHEEY, KRISHER,<sup>4</sup> MILLER, LAKSHMANAN, SPIVEY, STALEY AND WEISSMAN.<sup>4</sup>

The science of chemistry is so broad that completion of a well-planned course of undergraduate study is necessary before specialization. The curriculum outlined below describes such a course of study. The sequence of courses given should be followed as closely as possible. All of the chemistry courses listed are required. The electives must include four *lecture credits*

---

<sup>4</sup> Member of the Institute for Molecular Physics.

selected from among Chem. 125, Chem. 143, Chem. 195, Math. 66, or an advanced course in mathematics or physics that has Math. 21 as a prerequisite. The electives must also include Chem. 144 or Chem. 186 or Chem. 199H; Chem. 199H can be elected only by students in the chemistry honors program, and must be taken in the second semester of the senior year. Further information concerning the honors program in chemistry may be obtained from the Chemistry Department Honors Committee.

*First Year*

<i>First Semester</i>		<i>Second Semester</i>	
Chemistry 5 .....	4	Chemistry 15 .....	4
Mathematics 18 .....	3	Mathematics 19 .....	4
English 1 or 21 .....	3	English 3 .....	3
General Education .....	3	General Education .....	3
Health 5 .....	2	Speech 7 .....	2
Physical Education .....	1	Physical Education .....	1
	<hr/> 16		<hr/> 17

*Second Year*

Chemistry 35 .....	2	Chemistry 37 .....	2
Chemistry 40 .....	1	Chemistry 42 .....	1
Mathematics 20 .....	4	Chemistry 21 .....	4
Physics 20 .....	5	Mathematics 21 .....	4
English 4 .....	3	Physics 21 .....	5
	<hr/> 15		<hr/> 16

*Third Year*

Chemistry 187 .....	3	Chemistry 189 .....	3
Chemistry 182 .....	1	Chemistry 184 .....	1
Chemistry 141 .....	2	Chemistry 148 .....	2
German 1 .....	3	German 2 .....	3
General Education .....	3	General Education .....	3
Elective .....	3	Electives .....	4
	<hr/> 15		<hr/> 16

*Fourth Year*

Chemistry 123 .....	3	Chemistry 101 .....	3
German 6 .....	3	German 8 .....	3
General Education .....	3	Electives .....	9
Electives .....	8		<hr/> 15
	<hr/> 17		

## CHEMISTRY

### CHEM. 1, 3. GENERAL CHEMISTRY. (4, 4)

Two lectures, one quiz, and one three-hour laboratory period per week. Prerequisite, 1 year high school algebra or equivalent. (Staff)

### CHEM. 5. ADVANCED GENERAL CHEMISTRY. (4)

First semester. Three lectures and one three-hour laboratory period per week. Prerequisite, high school chemistry, placement in mathematics group I or II, and permission of the Chemistry Department. An advanced course in general chemistry for chemistry majors, which must be followed by Chem. 15. (Staff)

### CHEM. 11, 13. GENERAL CHEMISTRY. (3, 3)

Two lectures and one three-hour laboratory period per week. An abbreviated course in general chemistry for students in home economics and pre-nursing. This course is open only to students registered in home economics and pre-nursing. (Staff)

### CHEM. 15. QUALITATIVE ANALYSIS. (4)

Two lectures and two three-hour laboratory periods per week. Prerequisite, Chem. 3 or Chem. 5. (Staff)

### CHEM. 17. EQUILIBRIUM AND STOICHIOMETRY. (2)

First semester. Two lectures per week. Prerequisite, Chem. 3. A systematic study of the equilibria and stoichiometry involved in acid-base, precipitation, complex formation, and oxidation-reduction reactions. Not open to students with credit in Chem. 19 or 21. (Staff)

### CHEM. 19. ELEMENTS OF QUANTITATIVE ANALYSIS. (4)

Two lectures and two three-hour laboratory periods per week. Prerequisite, Chem. 3. An introduction to the basic theory and techniques of volumetric and gravimetric analysis. Primarily for students in engineering, agriculture, pre-medical, and pre-dental curricula. (Stuntz)

### CHEM. 21. QUANTITATIVE ANALYSIS. (4)

Second semester. Two lectures and two three-hour laboratory periods per week. Prerequisite, Chem. 15. An intensive study of the theory and techniques of inorganic quantitative analysis, covering primarily volumetric methods. Required of all students majoring in chemistry. (Stuntz)

### CHEM. 23. INORGANIC STRUCTURE AND CHEMICAL BONDING. (2)

Second semester. Two lectures per week. Prerequisite, Chem. 17, 19, or 21. Atomic structure, elementary molecular structure, chemical bonding from valence bond approach and from molecular orbital approach, bonding in coordination compounds, and the ionic bond. (Staff)

### CHEM. 31, 33. ELEMENTS OF ORGANIC CHEMISTRY. (3, 3)

Two lectures and one three-hour laboratory period per week. Prerequisite, Chem. 3, 5, or 13. Organic chemistry for students in agriculture, bacteriology, and home economics. (Reeve)

**CHEM. 35, 37. ELEMENTARY ORGANIC CHEMISTRY. (2, 2)**

Chem. 37, summer session. Two lectures per week. Prerequisite, Chem. 3, 5. A course for chemists, chemical engineers, pre-medical students, and pre-dental students. (Staff)

**CHEM. 36, 38. ELEMENTARY ORGANIC LABORATORY. (2, 2)**

Two three-hour laboratory periods per week. Prerequisites, Chem. 3 or 5; Chem. 35, 37 must be taken concurrently. (Woods)

**CHEM. 40, 42. ORGANIC CHEMISTRY LABORATORY FOR CHEMISTRY MAJORS. (1, 1)**

One three-hour laboratory period per week. Prerequisite, Chem. 3 or 5; Chem. 35, 37 must be taken concurrently. (Staff)

**CHEM. 81. GENERAL BIOCHEMISTRY. (4)**

First semester. Two lectures and two three-hour laboratory periods per week. Prerequisites, Chem. 33, or Chem. 37, 38. This course is designed primarily for students in home economics. (Henery-Logan)

**CHEM. 101. INORGANIC CHEMISTRY. (3)**

Second semester. Three lectures per week. Prerequisite, Chem. 187. (Staff)

**CHEM. 102. INORGANIC PREPARATIONS. (2)**

Second semester. Two three-hour laboratory periods per week. Prerequisite, Chem. 123. (Boyd)

**CHEM. 111. CHEMICAL PRINCIPLES. (4)**

Two lectures and two three-hour laboratory periods per week. Prerequisite, Chem. 3, or equivalent. Not open to students seeking a major in the physical sciences, since the course content is covered elsewhere in their curricula. A course in the principles of chemistry with accompanying laboratory work consisting of simple quantitative experiments. (Credit applicable only toward degree in College of Education.) (Jaquith)

**CHEM. 115. A SURVEY OF ORGANIC CHEMISTRY. (3)**

Summer School only. Open ONLY to registrants in the National Science Foundation Summer Institute. Five one-hour lectures per week; five three-hour laboratory periods per week. A systematic survey of compounds of carbon at the elementary level. (Staff)

**CHEM. 123. ADVANCED QUANTITATIVE ANALYSIS. (4)**

Two lectures and two three-hour laboratory periods per week. Prerequisite, Chem. 189 or concurrent registration therein. A continuation of Chem. 21, including volumetric, gravimetric, electrometric, and colorimetric methods. Required of all students majoring in chemistry. (Purdy)

**CHEM. 125. INSTRUMENTAL ANALYSIS. (4)**

Second semester. Two lectures and six hours of laboratory per week. Prerequisite, Chem. 189. A study of the application of physicochemical methods to analytical chemistry. Techniques such as polarography, potentiometry, conductivity and spectrophotometry will be included. (Purdy)

## CHEMISTRY

### CHEM. 141, 143. ADVANCED ORGANIC CHEMISTRY. (2, 2)

Two lectures per week. Prerequisites, Chem. 37, 38. An advanced study of the compounds of carbon. (Reeve)

### CHEM. 144. ADVANCED ORGANIC LABORATORY. (2-4)

Two or four three-hour laboratory periods per week. Prerequisites, Chem. 37, 38. (Pratt)

### CHEM. 148. THE IDENTIFICATION OF ORGANIC COMPOUNDS. (3)

Two three-hour laboratory periods per week. Prerequisite, Chem. 141. The systematic identification of organic compounds. (Pratt)

### CHEM. 150. ORGANIC QUANTITATIVE ANALYSIS. (2)

Two three-hour laboratory periods per week. Prerequisites, Chem. 19 or 21, and consent of the instructor. The semi-micro determination of carbon, hydrogen, nitrogen, halogen and certain functional groups. (Kasler)

### CHEM. 161, 163. BIOCHEMISTRY. (2, 2)

Two lectures per week. Prerequisite, Chem 33, or Chem. 37. This course is designed primarily for students in agriculture, bacteriology, or chemistry, and for those students in home economics who need a more extensive course in biochemistry than Chem. 81. (Henery-Logan)

### CHEM. 162, 164. BIOCHEMISTRY LABORATORY. (2, 2)

Two three-hour laboratory periods per week. Prerequisite, Chem. 33 or Chem. 38. (Henery-Logan)

### CHEM. 182, 184. PHYSICAL CHEMISTRY LABORATORY FOR CHEMISTRY MAJORS. (1, 1)

One three-hour laboratory period per week. Prerequisite, Chem. 19 or 21; Chem. 187, 189 must be taken concurrently. (Staff)

### CHEM. 186. ADVANCED PHYSICAL CHEMISTRY LABORATORY. (2)

Two three-hour laboratory periods per week. Prerequisites, Chem. 184, Chem. 189. (Staff)

### CHEM. 187, 189. PHYSICAL CHEMISTRY. (3, 3)

Three lectures per week. Prerequisite, Chem. 17, 19 or 21; Phys. 21; Math. 21; or consent of instructor. A course primarily for chemists and chemical engineers. This course must be accompanied by Chem. 188, 190. (Svirbely)

### CHEM. 188, 190. PHYSICAL CHEMISTRY LABORATORY. (2, 2)

Two three-hour laboratory periods per week. A laboratory course for chemical engineering students taking Chem. 187, 189. Students who have had Chem. 19, 21, or equivalent, cannot register for this course. (Staff)

### CHEM. 192, 194. GLASSBLOWING LABORATORY. (1, 1)

One three-hour laboratory period per week. Prerequisite, consent of instructor. (Carruthers)

### CHEM. 195. ADVANCED PHYSICAL CHEMISTRY. (2)

Prerequisite, Chem. 189. Quantum chemistry and other selected topics. (Staff)

### CHEM. 199H. SPECIAL PROJECTS. (2)

Honors projects for undergraduate students. (Staff)

*For Graduates*

- CHEM. 201. ADVANCED INORGANIC CHEMISTRY. (2)  
First semester. Two lectures per week. (Staff)
- CHEM. 202, 204. ADVANCED INORGANIC LABORATORY. (2, 2)  
Two three-hour laboratory periods per week. (Boyd)
- CHEM. 203. THE CHEMISTRY OF THE RARER ELEMENTS. (2)  
Second semester. Two lectures per week. (White)
- CHEM. 205. RADIOCHEMISTRY. (2)  
Two lectures per week. (Rollinson)
- CHEM. 206, 208. SPECTROGRAPHIC ANALYSIS. (1, 1)  
One three-hour laboratory period per week. Registration limited. Prerequisites, Chem. 184 and consent of the instructor. (White)
- CHEM. 207. CHEMISTRY OF COORDINATION COMPOUNDS. (2)  
Two lectures per week. (Rollinson)
- CHEM. 209. NON-AQUEOUS INORGANIC SOLVENTS. (2)  
Two lectures per week. (Jaquith)
- CHEM. 210. RADIOCHEMISTRY LABORATORY. (1-2)  
One or two four-hour laboratory periods per week. Registration limited. Prerequisites, Chem. 205 (or concurrent registration therein), and consent of instructor. (Lakshmanan)
- CHEM. 211. CHEMISTRY OF ORGANOMETALLIC COMPOUNDS. (2)  
Two lectures per week. (Grim)
- CHEM. 213. SELECTED TOPICS IN INORGANIC CHEMISTRY. (2)  
Two lectures a week. Prerequisite, Chem. 201, 203 or equivalent. An examination of some current topics in modern inorganic chemistry. (Staff)
- CHEM. 221, 223. CHEMICAL MICROSCOPY. (2, 2)  
One lecture and one three-hour laboratory period per week. Registration limited. Prerequisite, consent of instructor. Chem. 221 is a prerequisite for Chem. 223. A study of the use of the microscope in chemistry. Chem. 223 is devoted to study of the optical properties of crystals. (Stuntz)
- CHEM. 225. ADVANCED INSTRUMENTAL ANALYSIS. (4)  
Second semester. Two lectures and six hours of laboratory per week. Prerequisites, Chem. 189, 190 or concurrent registration therein. An intensive study of physicochemical methods as applied to analytical chemistry. Laboratory work will include experiments in such fields as polarography, coulometry and amperometry, potentiometry and spectrophotometry, nephelometry. (Purdy)
- CHEM. 226. SELECTED TOPICS IN ANALYTICAL CHEMISTRY. (4)  
First semester. Two lectures and two three-hour laboratory periods per week. Prerequisites, Chem. 125, 225, or consent of instructor. A study of advanced methods with emphasis on the modern techniques of analytical chemistry. (Purdy)

## CHEMISTRY

### CHEM. 240. ORGANIC CHEMISTRY OF HIGH POLYMERS. (2)

Two lectures per week. An advanced course covering the synthesis of monomers, mechanisms of polymerization, and the correlation between structure and properties in high polymers. (Bailey)

### CHEM. 241. STEREOCHEMISTRY. (2)

Two lectures per week. (Woods)

### CHEM. 243. MOLECULAR ORBITAL THEORY. (2)

Two lectures per week. A partial quantitative application of molecular orbital theory and symmetry to the chemical properties and reactions of organic molecules. Prerequisites, Chem. 143 and Chem. 189. (Staley)

### CHEM. 245. THE CHEMISTRY OF THE STEROIDS. (2)

Two lectures per week. (Pratt)

### CHEM. 249. PHYSICAL ASPECTS OF ORGANIC CHEMISTRY. (2)

Two lectures per week. (Woods)

### CHEM. 251. THE HETEROCYCLICS. (2)

Two lectures per week. (Pratt)

### CHEM. 254. ADVANCED ORGANIC PREPARATIONS. (2-4)

Two or four three-hour laboratory periods per week. (Pratt)

### CHEM. 258. THE IDENTIFICATION OF ORGANIC COMPOUNDS, AN ADVANCED COURSE. (3)

One lecture and two to four three-hour laboratory periods per week. Prerequisite, Chem. 141, 143 or concurrent registration therein. (Pratt)

### CHEM. 261, 263. ADVANCED BIOCHEMISTRY. (2, 2)

Two lectures per week. Prerequisite, Chem. 143 or consent of instructor. (Veitch)

### CHEM. 262, 264. ADVANCED BIOCHEMISTRY LABORATORY. (2, 2)

Two three-hour laboratory periods per week. Prerequisite, consent of instructor. (Veitch)

### CHEM. 265. ENZYMES. (2)

First semester. Two lectures per week. Prerequisite, Chem. 163. (Veitch)

### CHEM. 266. BIOLOGICAL ANALYSIS. (2)

Second semester. Two three-hour laboratory periods per week. Prerequisites, Chem. 19, 33. A study of analytical methods applied to biological material.

### CHEM. 267. THE CHEMISTRY OF NATURAL PRODUCTS. (2)

Two lectures per week. Prerequisite, Chem. 143. The chemistry and physiological action of natural products. Methods of isolation, determination of structure, and synthesis. (Henery-Logan)

### CHEM. 268. SPECIAL PROBLEMS IN BIOCHEMISTRY. (2-4)

Two to four three-hour laboratory periods per week. Prerequisites, Chem. 161, 162 and consent of instructor. (Veitch)

**CHEM. 269. ADVANCED RADIOCHEMISTRY. (2)**

Second semester. Two lectures per week. Prerequisite, Chem. 205 or consent of instructor. Utilization of radioisotopes with special emphasis on applications to problems in the life sciences. (Lakshmanan)

**CHEM. 270. ADVANCED RADIOCHEMISTRY LABORATORY. (1-2)**

Second semester. One or two four-hour laboratory periods per week. Prerequisites, Chem. 210 and 269 (or concurrent registration in Chem. 269) and consent of instructor. Registration limited. Laboratory training in utilization of radioisotopes with special emphasis on applications to problems in life sciences. (Lakshmanan)

**CHEM. 271. SPECIAL TOPICS IN BIOCHEMISTRY. BIOCHEMISTRY OF LIPIDS. (2)**

Two lectures per week. Prerequisite, Chem. 163. Classification and chemistry of lipids, lipopensis and energy metabolism of lipids, structural lipids, and endocrine control of lipid metabolism in mammals. (Lakshmanan)

**CHEM. 273. SPECIAL TOPICS IN BIOCHEMISTRY. COMPARATIVE BIOCHEMISTRY. (2)**

Two lectures per week. Prerequisite, Chem. 163. Energy sources and micro-nutrient requirements, gluconeogenesis, osmoregulation, nitrogen metabolism, detoxication and excretion, and comparative endocrinology. Deals with chordates only. (Lakshmanan)

**CHEM. 281. THEORY OF SOLUTIONS. (2)**

Two lectures per week. Prerequisite, Chem. 307 or equivalent. (Svirbely)

**CHEM. 285. COLLOID CHEMISTRY. (2)**

Prerequisite, Chem. 189 or equivalent. Two lectures per week. (Pickard)

**CHEM. 287. INFRA-RED AND RAMAN SPECTROSCOPY. (2)**

Two lectures per week. Prerequisite, consent of instructor. (Lippincott)

**CHEM. 295. HETEROGENEOUS EQUILIBRIA. (2)**

Prerequisite, Chem. 189 or equivalent. Two lectures per week. (Pickard)

**CHEM. 299. REACTION KINETICS. (3)**

Three lectures per week. (Svirbely)

**CHEM. 303. ELECTROCHEMISTRY. (3)**

Prerequisite, Chem. 307 or equivalent. Three lectures per week. (Atkinson)

**CHEM. 304. ELECTROCHEMISTRY LABORATORY. (2)**

Two three-hour laboratory periods per week. Prerequisite, consent of instructor. (Svirbely)

**CHEM. 307. CHEMICAL THERMODYNAMICS. (3)**

Prerequisite, Chem. 189 or equivalent. Three lectures per week. (Staff)

**CHEM. 311. PHYSICOCHEMICAL CALCULATIONS. (2)**

Prerequisite, Chem. 189 or equivalent. Two lectures per week. (Stewart)

## CLASSICAL LANGUAGES AND LITERATURES

### CHEM. 313. MOLECULAR STRUCTURE. (3)

Three lectures per week.

(Staff)

### CHEM. 317. CHEMICAL CRYSTALLOGRAPHY. (3)

Three lectures per week. Prerequisite, consent of instructor. A detailed treatment of single crystal X-ray methods.

(Stewart)

### CHEM. 319, 321. QUANTUM CHEMISTRY. (3, 3)

Three lectures per week. Prerequisite for Chem. 319 is Chem. 195. Prerequisite for Chem. 321 is Chem. 319 or Physics 212.

(Weissman, Vanderslice)

### CHEM. 323. STATISTICAL MECHANICS AND CHEMISTRY. (3)

Three lectures per week. Prerequisite, Chem. 307 or equivalent.

(Mason)

### CHEM. 351. SEMINAR. (1)

(Staff)

### CHEM. 399. RESEARCH.

(Staff)

## CLASSICAL LANGUAGES AND LITERATURES

*Professor and Head:* AVERY.

*Assistant Professor:* HUBBE.

*Instructor:* MACRO.

MAJOR IN LATIN: Latin 1, 2, 3, and 4 or their equivalent must have been completed before a student may begin work on a major in Latin. A student majoring in Latin will then begin his concentration with Latin 5. A major consists of a minimum of twenty-four hours beginning with Latin 5, twelve hours of which must be taken in 100-level courses. A major student who has taken Latin 1, 2, 3, and 4 may use credit so obtained to fulfill the twelve-hour foreign language requirement of the College of Arts and Sciences. Those registering initially for Latin 5 must fulfill this requirement in another foreign language, preferably Greek. No course with a grade less than "C" may be used to satisfy major requirements.

No placement tests are given in the Classical Languages. The following schedule will apply in general in determining the course level at which students will register for Latin and Greek. All students whose stage of achievement is not represented below are urgently invited to confer with the Head of the Department.

Students offering 0 or 1 unit of Latin will register for course 1.

Students offering 2 units of Latin will register for course 3.

Students offering 3 units of Latin will register for course 4.

Students offering 4 units of Latin will register for course 5.

No credit will be given for less than two semesters of Elementary Latin or Greek except as provided below in the course description of Latin 1, 2.

## CLASSICAL LANGUAGES AND LITERATURES

### LATIN

#### LATIN 1, 2. ELEMENTARY LATIN. (3, 3)

A student who has had two units of Latin in high school may register for Latin 1 for purposes of review, but not for credit; however, he may, under certain conditions, register for Latin 2 for credit with departmental permission.

(Hubbe and Staff)

#### LATIN 3. INTERMEDIATE LATIN (CAESAR). (3)

Prerequisite, Latin 1, 2 or equivalent.

(Macro and Staff)

#### LATIN 4. INTERMEDIATE LATIN (CICERO). (3)

Prerequisite, Latin 3 or equivalent.

(Macro and Staff)

#### LATIN 5. VERGIL'S AENEID. (3)

Prerequisite, Latin 4 or equivalent.

(Avery)

#### LATIN 51. HORACE. (3)

Prerequisite, Latin 5 or equivalent.

(Avery)

#### LATIN 52. LIVY. (3)

Prerequisite, Latin 51 or equivalent.

(Avery)

#### LATIN 61. PLINY'S LETTERS. (3)

Prerequisite, Latin 52 or equivalent.

(Avery)

#### LATIN 70. GREEK AND ROMAN MYTHOLOGY. (3)

Taught in English, no prerequisite. Cannot be taken for language credit. *This course is particularly recommended for students planning to major in Foreign Languages, English, History, the Fine Arts, and Journalism.*

(Macro)

#### *For Advanced Undergraduates and Graduates*

Prerequisite for 100 level courses, Latin 61.

#### LATIN 101. CATULLUS AND THE ROMAN ELEGIAC POETS. (3)

(Avery)

#### LATIN 102. TACITUS. (3)

(Avery)

#### LATIN 103. ROMAN SATIRE. (3)

(Avery)

#### LATIN 104. ROMAN COMEDY. (3)

(Avery)

#### LATIN 105. LUCRETIVS. (3)

(Avery)

#### LATIN 111. ADVANCED LATIN GRAMMAR. (3)

Prerequisite, three years of college Latin or equivalent. An intensive study of the morphology and syntax of the Latin language supplemented by rapid reading.

(Avery)

## COMPARATIVE LITERATURE

### LATIN 199. LATIN READINGS. (3)

Prerequisite, consent of instructor. The reading of one or more selected Latin authors from antiquity through the Renaissance. Reports. May be repeated with different content. (Avery)

#### *For Graduates*

### LATIN 210. VULGAR LATIN READINGS. (3)

Prerequisite, consent of instructor. An intensive review of the phonology, morphology, and syntax of Classical Latin, followed by the study of the deviations of Vulgar Latin from the classical norms, with the reading of illustrative texts. The reading of selections from the *Peregrinato ad loca sancta* and the study of divergences from classical usage therein, with special emphasis on those which anticipate subsequent developments in the Romance Languages. Reports. (Avery)

## GREEK

### GREEK 1, 2. ELEMENTARY GREEK. (3, 3)

(Hubbe)

### GREEK 3. INTERMEDIATE GREEK (XENOPHON). (3)

Prerequisite, Greek 1, 2 or equivalent.

(Hubbe)

### GREEK 4. INTERMEDIATE GREEK (HOMER). (3)

Prerequisite, Greek 3 or equivalent. See Greek 6.

(Hubbe)

### GREEK 5. HERODOTUS. (3)

Prerequisite, Greek 4 or equivalent.

(Hubbe)

### GREEK 6. THE NEW TESTAMENT. (3)

Prerequisite, Greek 3 or equivalent. Greek 6 will be substituted for Greek 4 upon demand of a sufficient number of students. (Hubbe)

### GREEK 51. EURIPIDES. (3)

Prerequisite, Greek 5 or equivalent.

(Hubbe)

### GREEK 52. PLATO. (3)

Prerequisite, Greek 51 or equivalent.

(Hubbe)

## COMPARATIVE LITERATURE

*Professor and Head:* ALDRIDGE.

*Professors:* COOLEY, GOODWYN, JONES, LEVITINE, MONTANO AND PRAHL.

*Associate Professor:* FRIEDMAN.

*Assistant Professor:* EVANS.

All literature courses numbered 100 or above in the departments of Classics, Foreign Languages and English as well as courses in Compara-

tive Literature are accepted for a major in comparative literature. Students with this major must have a knowledge of at least one approved foreign language demonstrated by successful completion of a course numbered 100 or above in that language.

Of the possible 24-40 hours offered as a major, the following courses are required:

Comparative Literature 101-102 and 150.

Six hours of other comparative literature courses.

Course work may not be limited to the nineteenth and twentieth centuries. Latin 70 is highly recommended.

*For Advanced Undergraduates and Graduates*

COMP. LIT. 101, 102. INTRODUCTORY SURVEY OF COMPARATIVE LITERATURE. (3, 3)

First semester. Survey of the background of European literature through study of Greek and Latin literature in English translations, discussing the debt of modern literature to the ancients. Second semester: study of medieval and modern continental literature. (Friedman)

COMP. LIT. 103. THE OLD TESTAMENT AS LITERATURE. (3)

A study of sources, development and literary types. (Evans)

COMP. LIT. 105. ROMANTICISM IN FRANCE. (3)

First semester. Lectures and readings in the French romantic writers from Rousseau to Baudelaire. Texts are read in English translations. (Parsons)

COMP. LIT. 106. ROMANTICISM IN GERMANY. (3)

Second semester. Continuation of Comp. Lit. 105. German literature from Buerger to Heine in English translations. (Prahl)

COMP. LIT. 107. THE FAUST LEGEND IN ENGLISH AND GERMAN LITERATURE. (3)

Second semester. A study of the Faust legend of the Middle Ages and its later treatment by Marlowe in *Dr. Faustus* and by Goethe in *Faust*. (Prahl)

COMP. LIT. 112. IBSEN. (3)

First semester. A study of the life and chief work of Henrik Ibsen with special emphasis on his influence on the modern drama.

COMP. LIT. 114. THE GREEK DRAMA. (3)

First semester. The chief works of Aeschylus, Sophocles, Euripides, and Aristophanes in English translations. Emphasis on the historic background, on dramatic structure, and on the effect of the Attic drama upon the mind of the civilized world. (Prahl)

COMP. LIT. 125. LITERATURE OF THE MIDDLE AGES. (3)

Narrative, dramatic, and lyric literature of the Middle Ages studied in translation. (Cooley)

## COMPARATIVE LITERATURE

### COMP. LIT. 130. THE CONTINENTAL NOVEL. (3)

The novel in translation from Stendhal through the Existentialists, selected from literatures of France, Germany, Italy, Russia, and Spain. (Friedman)

### COMP. LIT. 135. DANTE AND THE ROMANCE TRADITION. (3)

A reading of the *Divine Comedy* to enlighten the discovery of reality in western literature. (Montano)

### COMP. LIT. 140. LITERATURE OF THE FAR EAST. (3)

Classics of the Orient in translation. (Evans)

### COMP. LIT. 150. CONFERENCE COURSE IN COMPARATIVE LITERATURE. (3)

Second semester. A tutorial type discussion course, correlating the courses in various literatures which the student has previously taken with the primary themes and masterpieces of world literature. This course is required of undergraduate majors in comparative literature, but must not be taken until the final year of the student's program. (Friedman)

### *For Graduates*

### COMP. LIT. 201. PROBLEMS IN COMPARATIVE LITERATURE. (3)

Second semester. A research seminar for M.A. candidates only. (Friedman)

### COMP. LIT. 225. THE MEDIEVAL EPIC. (3)

First semester. A comparative interpretation of *Beowulf*, the *Waltharius*, the *Chanson de Roland*, the *Nibelungenlied*, and the *Cid*. (Jones)

### COMP. LIT. 226. THE MEDIEVAL ROMANCE. (3)

Second semester. An interpretation of the principal works of the genre. (Jones)

### COMP. LIT. 230. PROBLEMS OF THE BAROQUE IN LITERATURE. (3)

First semester. The passage from Mannerism to the most characteristic theoretical and creative manifestations of Baroque. (Montano)

### COMP. LIT. 240. LITERARY CRITICISM: ANCIENT AND MEDIEVAL. (3)

First semester. From Aristotle to the fifteenth century. (Montano)

### COMP. LIT. 241. LITERARY CRITICISM: RENAISSANCE AND MODERN. (3)

Second semester. From Petrarch to the present. (Montano)

### COMP. LIT. 258. FOLKLORE IN LITERATURE. (3)

A study of folk heroes, motifs, and ideas as they appear in the world's masterpieces. (Goodwyn)

### COMP. LIT. 268. SEMINAR IN LITERARY SOURCES OF ART HISTORY. (3)

Second semester. Art historical sources from Pliny to Malraux. (Same as Art 268.) (Levitine)

### COMP. LIT. 301. SEMINAR IN THEMES AND TYPES. (3)

First semester. Prerequisite, one year's graduate work in literature and the knowledge of one language other than English. Intensive study of fundamental motifs and trends in western literature. (Aldridge)

## COMPUTER SCIENCE

*Research Professor:* RHEINBOLDT.

*Associate Director and Instructor:* MENARD.

*Associate Professors:* GLASSER AND SCHWEPPE.

*Research Associate Professor:* ROSENFELD.

*Assistant Professor:* AUSTING.

*Research Assistant Professor:* ORTEGA.

*Instructors:* CHAPPELL AND LINDAMOOD.

The courses in Computer Science are designed to offer students in all fields an introduction to the academic discipline concerned with the use of computers. This area of study includes the development of algorithms to solve problems, the learning of languages suitable for stating algorithms, the translation of such algorithms into machine instructions, the efficient use of structured data, the techniques of solving numeric and non-numeric problems with the aid of computers, the mathematical theory of machines, and other related topics. As yet there is no degree program in Computer Science, but it is expected that students from many disciplines will wish to incorporate these courses into their studies.

The Computer Science Center is an interdisciplinary academic department of the University which reports directly to the Vice President for Academic Affairs and thus is not part of any school or college. The descriptions of courses in Computer Science are entered in the catalog of the College of Arts and Sciences for the convenience of students and faculty of the College.

The Center is charged with the triple function of providing a centralized computing service for all academic activities of the University, building an educational program in computer science, and conducting an active research program in the computer and computer related sciences. For further information please contact the Computer Science Center.

## C. S. 12. INTRODUCTORY ALGORITHMIC METHODS. (3)

Two lectures and one two-hour laboratory period per week. Prerequisite, Math. 11 or equivalent. Laboratory fee, \$10.00. Designed for students not majoring in mathematics, the physical sciences, or engineering. Study of the algorithmic approach in the analysis of problems and their computational solution. Definition and use of a particular algorithmic language. Computer projects based on elementary algebra and probability; linear equations and matrices; and the ordering, searching, sorting, and manipulating of data.

## C. S. 20. ELEMENTARY ALGORITHMIC ANALYSIS. (3)

Two lectures and one two-hour laboratory period per week. Prerequisite, Math. 20, or concurrent registration therein, or equivalent. Laboratory fee, \$10.00.

## ECONOMICS

Concept and properties of an algorithm, language and notation for describing algorithms, analysis of computational problems and development of algorithms for their solution, use of specific algorithmic languages in solving problems from numerical mathematics, completion of several projects using a computer.

### C. S. 21. NUMERICAL CALCULUS LABORATORY I. (1 or 2)

Two hours laboratory per week for each credit hour. Prerequisite, Math 21 or concurrent registration therein, and C. S. 20; or equivalents. Laboratory fee, \$10.00 for one credit, \$15.00 for two credits. Laboratory work in the development of algorithmic solutions of problems taken from numerical calculus with emphasis on efficiency of computation, and the control of errors. Basic one-credit laboratory includes completion of several machine projects on material related to Math. 21. Second credit involves more comprehensive projects based on similar or related material.

### C. S. 22. NUMERICAL CALCULUS LABORATORY II. (1 or 2)

Two hours laboratory per week for each credit hour. Prerequisite, Math. 22 or concurrent registration therein and C. S. 20, or equivalents. Laboratory fee, \$10.00 for one credit, \$15.00 for two credits. Laboratory work in the development of algorithmic solutions of problems taken from numerical linear algebra with emphasis on efficiency of computation and the control of errors. Basic one-credit laboratory includes completion of several machine projects on material related to Math. 22. Second credit involves more comprehensive projects based on similar or related material.

### C. S. 100. LANGUAGE AND STRUCTURE OF COMPUTERS. (3)

Two lectures and one two-hour laboratory period per week. Prerequisite, C. S. 12 or C. S. 20 or equivalent. Laboratory fee, \$10.00. Logical basis of computer structure, machine representation of numbers and characters, flow of control, instruction codes, arithmetic and logical operations, indexing and indirect addressing, input-output, push-down stacks, symbolic representation of programs and assembly systems, subroutine linkage, macros, interpretive systems, and recent advances in computer organization. Several computer projects to illustrate basic concepts.

### C. S. 110. SPECIAL COMPUTATIONAL LABORATORY. (1 or 2)

Two hours laboratory per week for each credit hour. Prerequisite, C.S. 12 or equivalent. Laboratory fee, \$10.00 for one credit, \$15.00 for two credits. Arranged for special groups of students to give experience in developing algorithmic solutions of problems or using particular computational systems. May be taken for cumulative credit up to a maximum of six hours where different material is covered.

## ECONOMICS

Students registered in the College of Arts and Sciences may major in economics. During the freshman and sophomore years prospective economics majors should consult with their lower division adviser in Arts and Sciences concerning preparation for the major. Normally Econ. 4—Economic Developments (3) is taken during the freshman year and Econ. 31, 32—Principles of Economics (3, 3) during the sophomore year.

## ENGLISH LANGUAGE AND LITERATURE

Juniors and seniors are advised by the faculty of the Department of Economics, which is administered in the College of Business and Public Administration. In addition to the nine lower division credits listed above, economics majors must complete a minimum of 27 credits with an average grade of not less than "C." Econ. 102—National Income Analysis (3); Econ. 132—Advanced Economic Principles (3); and B.A. 130—Business Statistics I (3), are required. Other courses to meet the requirements of the major are to be selected with the aid of a faculty adviser. Descriptions of courses in economics will be found in the catalog of the College of Business and Public Administration. Additional information about the curriculum in economics may be obtained at the departmental office.

## ENGLISH LANGUAGE AND LITERATURE

*Professor and Head:* MURPHY.

*Professors:* BODE, COOLEY, HARMAN (EMERITUS), MANNING, McMANAWAY (P.T.), MISH AND ZEEVELD.

*Associate Professors:* ANDREWS, BARNES, BEALL, BROWN, FLEMING, GRAVELY, HOVEY, LUTWACK, MYERS, PORTZ, G. SMITH, THORBERG, WARD AND WEBER.

*Assistant Professors:* BIRDSALL, BROSDAHAN, BRYER, COOPER, COULTER, DUFFY, HERMAN, S. HOLTON, HOUPPERT, JELLEMA, KENNEY, KINNAIRD, LAWSON, MARTIN, McMILLAN, PANICHAS, RODGERS, SCHAUHANN, D. SMITH AND WILSON.

*Lecturers:* FLETCHER (VISITING), LOGAN AND ORR.

*Instructors:* BUHLIG, CARLSON, CATE, CROZIER, DACHSLAGER, DEMAREE, DUNN, EIKEL, B. FELDMANN (P.T.), FITZMAURICE, FORMAN (P.T.), GADZIOLA, GRIMES, M. HOLTON, HORRELL, HOWARD, JAMES, JOHNSON, JONES (P.T.), KARR, LANDON, MOREINES, NELSON, SCHAEFER (P.T.), C. SMITH (P.T.), STEVENSON, STONE, TROUSDALE, WALT, WHALEY, WILAN (P.T.) AND WRIGHT.

A major program in English must include 24 hours chosen from courses in several groups, as follows:

1. Three hours in language (Engl. 8, 101, 102, 104, 105, 107).
2. Six hours in major figures (Engl. 104, 115, 116, 121).
3. Nine hours in survey or type courses (six hours from Engl. 110, 111, 112, 113, 120, 122, 123, 125, 126, 129, 130, 134, 135; 55 or 56; three hours from Engl. 139, 140, 141, 143, 144, 145, 157).
4. Six hours in American literature (Engl. 148, 150, 151, 152, 155, 156).

## ENGLISH LANGUAGE AND LITERATURE

No course with a grade less than "C" may be used to satisfy major requirements.

In selecting minor or elective subjects, students majoring in English, particularly those who plan to do graduate work, should give special consideration to courses in French, German, Latin, philosophy, and history.

**HONORS:** The Department of English offers an honors program, primarily for majors but open to others with the approval of the departmental honors committee. Interested students should ask for detailed information from an English Department adviser no later than the beginning of their junior year.

Eng. 1 or 21 is prerequisite to courses numbered 3 through 56.

### ENG. 1. COMPOSITION. (3)

Required of freshmen. See Eng. 21. The study and application of rhetorical principles in expository prose; frequent themes. (Barnes, Herman, Staff)

### ENG. 3. WORLD LITERATURE. (3)

Fulfills part of the general education requirement. See Eng. 33. Homer to the Renaissance, foreign classics being read in translation. (Cooley, McMillan, Staff)

### ENG. 4. WORLD LITERATURE. (3)

Fulfills part of the general education requirement. See Eng. 34. Shakespeare to the present, foreign classics being read in translation. (Cooley, McMillan, Staff)

### ENG. 7. TECHNICAL WRITING. (2)

(Coulter, Walt)

### ENG. 8. INTRODUCTION TO ENGLISH GRAMMAR. (3)

A brief review of traditional English grammar, and an introduction to structural grammar, including phonology, morphology, and syntax. (James, Crozier)

### ENG. 9. INTRODUCTION TO NARRATIVE LITERATURE. (3)

Prerequisite, Eng. 1 or 21. An intensive study of representative stories, with lectures on the history and technique of the short story and other narrative forms. (Staff)

### ENG. 10. COMPOSITION AND LITERARY TYPES. (3)

Not open to students who have taken Eng. 21. A study of literary genres with writing based on the readings. (Barnes, Staff)

### ENG. 12. INTRODUCTION TO CREATIVE WRITING. (3)

Additional prerequisite, sophomore standing and departmental permission. (Jellema, Lawson, Schaumann)

### ENG. 14. EXPOSITORY WRITING. (3)

(Barnes, Staff)

### ENG. 15. READINGS IN BIOGRAPHY. (3)

An analytical study in the form and technique of biographical writing in Europe and America. (Ward)

## ENGLISH LANGUAGE AND LITERATURE

### ENG. 21. HONORS COMPOSITION. (3)

May be elected by eligible students in place of Eng. 1 to satisfy general education requirement. Survey of principles of composition, rhetoric, and techniques of research; readings in essays, short stories, poetry; frequent themes.

(Thorberg, Staff)

### ENG. 33. HONORS WORLD LITERATURE. (3)

May be elected by eligible students in place of Eng. 3 to satisfy general education requirement. Homer to the Renaissance, foreign classics being read in translation.

(Cooley, Staff)

### ENG. 34. HONORS WORLD LITERATURE. (3)

May be elected by eligible students in place of Eng. 4 to satisfy general education requirement. Shakespeare to the present, foreign classics being read in translation.

(Cooley, Staff)

### ENG. 55. ENGLISH LITERATURE FROM THE BEGINNINGS TO 1800. (3)

(Cooper, Staff)

### ENG. 56. ENGLISH LITERATURE FROM 1800 TO THE PRESENT. (3)

(Cooper, Staff)

### *For Advanced Undergraduates and Graduates*

Eng. 3-4 (or 33-34) are prerequisites to courses numbered 101 through 199.

### ENG. 101. HISTORY OF THE ENGLISH LANGUAGE. (3)

(Herman, James)

### ENG. 102. OLD ENGLISH. (3)

(Brosnahan)

### ENG. 104. CHAUCER. (3)

(Cooley, Brosnahan)

### ENG. 105. INTRODUCTION TO LINGUISTICS. (3)

Same as Foreign Language 101.

(Miller)

### ENG. 107. AMERICAN ENGLISH. (3)

(Herman)

### ENG. 110, 111. ELIZABETHAN AND JACOBEAN DRAMA. (3, 3)

(Zeeveld)

### ENG. 112, 113. LITERATURE OF THE RENAISSANCE. (3, 3)

(Zeeveld, Cooper)

### ENG. 115, 116. SHAKESPEARE. (3, 3)

(Zeeveld, Cooper, Houppert, D. Smith, Logan)

### ENG. 120. ENGLISH DRAMA FROM 1660 TO 1800. (3)

(Ward)

### ENG. 121. MILTON. (3)

(Murphy, Mish)

## ENGLISH LANGUAGE AND LITERATURE

- ENG. 122. LITERATURE OF THE SEVENTEENTH CENTURY, 1600-1660. (3)  
(Murphy, Mish)
- ENG. 123. LITERATURE OF THE SEVENTEENTH CENTURY, 1660-1700. (3)  
(Wilson)
- ENG. 125, 126. LITERATURE OF THE EIGHTEENTH CENTURY. (3, 3)  
(Myers)
- ENG. 129, 130. LITERATURE OF THE ROMANTIC PERIOD. (3, 3)  
(Weber, Kinnaird, G. Smith)
- ENG. 134, 135. LITERATURE OF THE VICTORIAN PERIOD. (3, 3)  
(Brown, Fletcher)
- ENG. 139, 140. THE ENGLISH NOVEL. (3, 3)  
(Ward, Kenney)
- ENG. 141. MAJOR BRITISH WRITERS. (3)  
Two writers studied intensively each semester. (Fleming, Panichas, Fletcher)
- ENG. 143. MODERN POETRY. (3)  
(Fleming, Jellema)
- ENG. 144. MODERN DRAMA. (3)  
(Weber)
- ENG. 145. THE MODERN NOVEL. (3)  
(Andrews, Panichas)
- ENG. 148. THE LITERATURE OF AMERICAN DEMOCRACY. (3)  
(Barnes)
- ENG. 150, 151. AMERICAN LITERATURE. (3, 3)  
(Gravely, Hovey, Thorberg, Bryer, Lawson)
- ENG. 152. THE NOVEL IN AMERICA. (3)  
A historical survey of the development of the American novel from its eighteenth century beginnings to the twentieth century. (Hovey, Thorberg)
- ENG. 155, 156. MAJOR AMERICAN WRITERS. (3, 3)  
Two writers studied intensively each semester.  
(Manning, Gravely, Lutwack, Portz)
- ENG. 157. INTRODUCTION TO FOLKLORE. (3)  
(Birdsall, McMillan)
- ENG. 160. ADVANCED EXPOSITORY WRITING. (3)  
(Myers, Horrell, Stevenson)
- ENG. 170. CREATIVE WRITING. (3)  
(Fleming)

## ENGLISH LANGUAGE AND LITERATURE

- ENG. 171. ADVANCED CREATIVE WRITING. (3)  
(Fleming)
- ENG. 172. PLAYWRITING. (3)  
(Fleming)
- ENG. 190, 191. HONORS CONFERENCE AND READING. (1, 1)  
Second semester. Prerequisite, candidacy for honors in English. Candidates will take Eng. 190 in their junior year and Eng. 191 in their senior year. (Staff)
- ENG. 199. SENIOR PROSEMINAR IN LITERATURE. (3)  
Open only to seniors. First semester. Required of candidates for honors and strongly recommended to those who plan to do graduate work. Individual reading assignments; term paper. (Staff)

### *For Graduates*

- ENG. 201. BIBLIOGRAPHY AND METHODS. (3)  
(Mish, Hovey)
- ENG. 202. MIDDLE ENGLISH. (3)  
(Cooley, Brosnahan)
- ENG. 204. SEMINAR IN MEDIEVAL LITERATURE. (3)  
(Cooley, Brosnahan)
- ENG. 206, 207. SEMINAR IN RENAISSANCE LITERATURE. (3, 3)  
(McManaway, Zeeveld)
- ENG. 210. SEMINAR IN SEVENTEENTH-CENTURY LITERATURE. (3)  
(Mish)
- ENG. 212, 213. SEMINAR IN EIGHTEENTH-CENTURY LITERATURE. (3, 3)  
(Myers)
- ENG. 214, 215. SEMINAR IN NINETEENTH-CENTURY LITERATURE. (3, 3)  
(Brown, Kinnaird, Fletcher)
- ENG. 216, 217. LITERARY CRITICISM. (3, 3)  
(Lutwack)
- ENG. 218. SEMINAR IN LITERATURE AND THE OTHER ARTS. (3)  
(Myers)
- ENG. 225, 226. SEMINAR IN AMERICAN LITERATURE. (3, 3)  
(Bode, Hovey)
- ENG. 227, 228. PROBLEMS IN AMERICAN LITERATURE. (3, 3)  
(Aldridge)
- ENG. 230. SPECIAL STUDIES IN ENGLISH LITERATURE TO 1600. (3)  
(Cooley, Cooper)

## FOREIGN LANGUAGES AND LITERATURES

ENG. 232. SPECIAL STUDIES IN ENGLISH LITERATURE, 1600-1800. (3)  
(Mish, Myers)

ENG. 235. SPECIAL STUDIES IN 19TH CENTURY ENGLISH LITERATURE.  
(3)  
(Brown, G. Smith)

ENG. 237. SPECIAL STUDIES IN AMERICAN LITERATURE. (3)  
(Lutwack, Portz)

ENG. 241, 242. STUDIES IN TWENTIETH-CENTURY LITERATURE. (3, 3)  
(Bode, Hovey)

ENG. 399. THESIS RESEARCH. (1-6)  
Arranged. (Staff)

## FOREIGN LANGUAGES AND LITERATURES

*Associate Professor and Acting Head:* PARSONS.

*Professors:* BINGHAM, GOODWYN, JONES, NEMES, PRAHL, QUINN, RAND AND ZUCKER (EMERITUS).

*Visiting Professors:* BETTEX AND IWRY.

*Associate Professors:* ALTER, DOBERT, GRAMBERG, HERING, KRAMER (EMERITUS), MENDELOFF, PARSONS, ROSENFELD AND ROVNER.

*Assistant Professors:* BRIDGERS, BOYD, CHEN, DEMAITRE, GREENBERG, HABERL, HALL, HITCHCOCK, KELLY, MILLER, MOELLER, NORTON, ROSWELL, VASSYLKIVSKY, VOGELGESANG AND ZIMMERMAN.

*Lecturer:* C. JOHNSON.

*Instructors:* AMBLER, AMENT (P.T.), ARMSTRONG, BARRABINI, J. CAP (P.T.), CHRISTOV, L. CLEMENS (P.T.), S. CLEMENS (P.T.), COOK (P.T.), FINK, FONT, D. GRAY (P.T.), W. GRAY, HALL, HERDOIZA, IRWIN (P.T.), JACOBS, JOHNSON, JURAN, KEMNER, KNOCH, LEMAIRE (P.T.), MEYER, MONCAYO, MOTTA, PANICO, RENTZ, RODRIGUEZ, SAENZ (P.T.), SALGADO, SONNTAG, SPROUT, STERN, SUZYNSZKI, TUNIKS, WEGIMONT AND WILTS.

MAJORS: Two types of undergraduate majors are offered in French, German, Russian, or Spanish: one for the general student or the future teacher, and the other for those interested in a rounded study of a foreign area for the purpose of understanding another nation through its literature, history, sociology, economics, and other aspects. Both of these majors confer the

## FOREIGN LANGUAGES AND LITERATURES

B.A. degree. (The Department also offers M.A. and Ph.D. degrees in language and literature, but not in area study.)

An undergraduate major in either language and literature or area requires a total of 33 hours, with a "C" average, above the basic Arts and Sciences College foreign language requirement.

**LANGUAGE AND LITERATURE MAJOR:** Course 11 is a prerequisite to this major unless waived by the Head of Department. Specific minimum requirements in the program in French, German, or Spanish are: three semester courses in advanced language (two to be selected from courses 12, 80, 81 and one from courses 103, 104); two semesters of the survey of literature (courses 75, 76 or 77, 78); four semester courses selected from literature courses numbered 100 to 199; and Comparative Literature 101 and 102<sup>5</sup>—a total of 33 hours. Requirements for a language major in Russian comprise: three semesters of advanced Russian (courses 12 or 13, 71 or 72, and 80 or 81), plus two semesters of the survey of literature, Russian 75 and 76; four semesters in 100-level courses; and Comparative Literature 101 and 102<sup>5</sup>—a total of 33 hours.

**FOREIGN AREA MAJOR:** The area study major in French, German, Russian, or Spanish endeavors to provide the student with a knowledge of various aspects of the country whose language he is studying. Specific requirements in this major are: five semester courses in advanced language (courses 12, 71, 72, 80, 81); two semester courses in civilization (courses 171, 172 or 173, 174); two semester courses in literature numbered 100 to 199; and Comparative Literature 101 and 102<sup>5</sup>—a total of 33 hours.

**HONORS IN FRENCH, GERMAN OR SPANISH:** A student whose major is in French, German, or Spanish and who, at the time of application, has a general academic average of 3.0 to 3.5 in his major field, may apply to the Chairman of the Honors Committee for admission to the Honors Program of the Department. Honors work normally begins in the first semester of the junior year, but a qualified student may enter as early as the sophomore year or as late as the second semester of the junior year. Honors students are required to take two courses from those numbered 195, 196, 197 and the seminar numbered 199, as well as to meet other requirements for a major in Foreign Languages. There will be a final comprehensive examination, covering the honors reading list, which must be taken by all graduating seniors who are candidates for honors. Admission of students to the Honors Program, their continuance in the program, and the final award of honors are the prerogative of the Departmental Honors Committee.

---

<sup>5</sup> In all language major programs the Head of the Department has authority to relieve a student of the requirement in Comparative Literature 101 and 102 provided that the student takes a comparable course or courses in Comparative Literature, English or his major language at the 100-level as a substitution with the approval of the Head of Department.

## FOREIGN LANGUAGES AND LITERATURES

**ELEMENTARY HONORS:** Course 3 in French, German, and Spanish is limited to specially approved candidates who have passed Course 1 with high grades, and will allow them to by-pass Course 6 to complete their requirement by completing Course 7.

**LOWER DIVISION COURSES:** At the beginning of each semester a placement examination is given for those students who wish to continue in the University a foreign language which they have studied for two or more years in high school (French, German, Spanish).<sup>6</sup> Such students have the option of enrolling in Course 5 or taking a placement examination. Students with two or more years of high school language may not take Courses 1 or 2 in that language for credit unless there has been a six year lapse of time between their last high school course in that language and the date of their matriculation at the University. Students with only one year of high school language may take Courses 1 and 2 in that language for credit. Students with two or more years of high school language who place in Course 5 must complete in addition Courses 6, 7 and 11 or 12; those who place in 6 must complete 7 and 11 or 12; those who place in 7 or higher may fulfill the College requirement by taking any 2 courses *above* Course 6. In German the course sequence is 5, 6, 7, 8 or 9. German 9 is not to be taken to meet the college requirement unless the student has completed German 7.

Transfer students with college credit have the option of continuing at the level for which they are theoretically prepared, or placement examination, or electing Course 5. If a transfer student takes Course 5 for credit, he may retain transfer credit *only* for the equivalent of Course 1. A transfer student placing lower than his training should warrant may ignore the placement but **DOES SO AT HIS OWN RISK.**

If a student has received a "D" in a course, advanced and completed the next higher course, he cannot go back and repeat the original "D."

No credit will be given, even elective, for a single semester of language 1.

A student whose native language is taught at the University may not meet the college requirement by taking Courses 1, 2, 6, 7, 80 and 81. There is a special option by which foreign students may offer a combination of Foreign Language 1 and 2 (English for Foreign Students) and 12 hours of other English courses to satisfy both the Arts and Sciences English and Foreign Language requirements. This option may not be used by pre-medical students.

The Civilization courses (171, 172) cannot be used toward the foreign language requirement except by students who *begin* language at the University with a fifth semester course (8) or higher.

### FOREIGN LANGUAGE 1-2. ENGLISH FOR FOREIGN STUDENTS. (3, 3)

An introduction to English usage, adapted to the needs of the non-English-speaking student. Pronunciation, spelling, syntax; the differences between English and various other languages are stressed. (Bridgers)

---

<sup>6</sup> Students who have studied Chinese, Hebrew, Italian or Russian apply to the Department for special examination, since there is no Course 5 in these languages.

## FOREIGN LANGUAGES AND LITERATURES

### FOREIGN LANGUAGE 101. INTRODUCTION TO LINGUISTICS. (3)

Introduction to the basic concepts of modern descriptive linguistics. Phonology, morphology, syntax. Examinations of the methods of comparative linguistics, internal reconstruction, dialect geography. (Miller)

### FOREIGN LANGUAGE 102. PHONETICS AND PHONEMICS. (3)

Training in the identification, description, and symbolization of various sounds found in language. Study of scientific techniques for classifying sounds into units which are perceptually relevant for a given language. (Miller)

### FOREIGN LANGUAGE 140. ORAL PRACTICE IN MODERN FOREIGN LANGUAGES (FRENCH, GERMAN, RUSSIAN OR SPANISH). (3)

Development of fluency in modern foreign languages, stress on correct sentence structure and idiomatic expression. Especially designed for teachers, or for practice in speaking the language. (Rovner, Staff)

### FOREIGN LANGUAGE 171. ADVANCED FRENCH PHONETICS. (3)

First semester. Pronunciation of modern French. The sounds and their production, the stress group, intonation. Attention is called to Ed. 142 and Ed. 143. (Hall)

## CHINESE

### CHINESE 1-2. ELEMENTARY CHINESE. (3, 3)

Three recitations and one laboratory period per week. Elements of pronunciation, simple ideograms, colloquial conversation, translation. (Chen)

### CHINESE 6-7. INTERMEDIATE CHINESE. (3, 3)

Three recitations per week; additional electronic laboratory in Chinese 6. Prerequisite, Chinese 2 or equivalent. Reading of texts designed to give some knowledge of Chinese life, thought, and culture. (Chen)

### CHINESE 101-102. READING FROM CHINESE HISTORY. (3, 3)

Prerequisite, Chinese 7 or equivalent. Based on an anthology of historians from the Chou to the Ching dynasties. (Chen)

### CHINESE 171-172. CHINESE CIVILIZATION. (3, 3)

This course supplements Geog. 134 and 135, *Cultural Geography of East Asia*. It deals with Chinese literature, art, folklore, history, government, and great men. Second semester: developments in China since 1911. The course is given in English translation. (Chen)

## FRENCH

### FRENCH 0. ELEMENTARY FRENCH FOR GRADUATE STUDENTS.

#### (0 OR AUDIT)

Intensive elementary course in the French language designed particularly for graduate students who wish to acquire a reading knowledge. (Hall)

### FRENCH 1-2. ELEMENTARY FRENCH. (3, 3)

Each semester; given as intensive course in summer session. Two recitations and two audio-lingual drills per week. Study of linguistic structure and development of audio-lingual and writing ability. (Cap, Staff)

## FOREIGN LANGUAGES AND LITERATURES

### FRENCH 3. ELEMENTARY FRENCH, HONORS COURSE. (3)

Two recitations and two audio-lingual drills per week. Enrollment limited to specially approved candidates from French 1. Students taking this course will normally continue in French 7. (Alter)

### FRENCH 5. REVIEW OF ELEMENTARY FRENCH. (3)

Two recitations and two audio-lingual drills per week, or three recitations and one audio-lingual drill, depending on circumstances. Enrollment limited to students who, having taken placement examinations, have failed to qualify for French 6. (Gray, Staff)

### FRENCH 6-7. INTERMEDIATE FRENCH. (3, 3)

Three recitations per week; additional electronic laboratory in French 6. Given as intensive course in summer session. Prerequisite: French 2 or equivalent, or French 5, except that recommended students may enter French 7 from French 3. Study of linguistic structure, further development of audio-lingual and writing ability, and reading of literary texts with discussion in French. Usually there will be an honors section for qualified students. (Johnson)

### FRENCH 10. SCIENTIFIC FRENCH. (3)

Prerequisite: French 7. Reading of technical and scientific prose with some attention to audio-lingual and linguistic objectives. (Johnson, Barrabini)

### FRENCH 11. INTRODUCTION TO FRENCH LITERATURE. (3)

Prerequisite: French 7. Required of all students who continue in advanced courses of Department, with the exception of superior students who are permitted to bypass an introduction to French literature. May be taken concurrently with French 12. (Staff)

### FRENCH 12. CONVERSATION AND COMPOSITION. (3)

Prerequisite: French 7. A practical language course recommended for all students continuing in French. May be taken concurrently with French 11. (Vassylivsky)

### *For Advanced Undergraduates*

### FRENCH 41. FRENCH PHONETICS. (3)

Prerequisite: French 7 or equivalent. Elements of French phonetics, diction and intonation. (Hall)

### FRENCH 71-72. REVIEW GRAMMAR AND COMPOSITION. (3, 3)

Prerequisite: French 11 and 12 or equivalent. For students who, having a good knowledge of French, wish to become more proficient in the written and spoken language. (Bingham, Barrabini)

### FRENCH 75-76. SURVEY OF FRENCH LITERATURE. (3, 3)

Prerequisite: French 11 or equivalent. An elementary survey of the chief authors and movements in French literature. (Quynn, Rosenfield)

### FRENCH 80-81. ADVANCED CONVERSATION. (3, 3)

Prerequisite: French 11 and 12 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language. (Alter)

## FOREIGN LANGUAGES AND LITERATURES

### *For Advanced Undergraduates and Graduates*

#### FRENCH 101. APPLIED LINGUISTICS. (3)

The nature of Applied Linguistics and its contributions to the effective teaching of foreign languages. Comparative study of English and French, with emphasis upon points of divergence. Analysis, evaluation and construction of related drills. (Mendeloff)

#### FRENCH 103-104. ADVANCED COMPOSITION. (3, 3)

Translation from English into French, free composition, practical study of syntactical structure. (Alter)

#### FRENCH 107. INTRODUCTION TO MEDIEVAL LITERATURE. (3)

French literary history from the ninth through the fifteenth century, selected readings from representative texts. (Mendeloff)

#### FRENCH 111. FRENCH LITERATURE OF THE SIXTEENTH CENTURY. (3)

The Renaissance in France; humanism; Rabelais and Calvin; the Pleiade; Montaigne. (Quynn)

#### FRENCH 115-116. FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. (3, 3)

First semester: Descartes, Pascal, Corneille, Racine. Second semester: the remaining great classical writers, with special attention to Moliere. (Quynn, Rosenfield)

#### FRENCH 125-126. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY. (3, 3)

First semester: development of the philosophical and scientific movement; Montesquieu. Second semester: Voltaire, Diderot, Rousseau. (Bingham, Rosenfield)

#### FRENCH 131-132. FRENCH LITERATURE OF THE NINETEENTH CENTURY. (3, 3)

First semester: drama and poetry from Romanticism to Symbolism. Second semester: the major prose writers of the same period. (Alter, Zimmerman)

#### FRENCH 141-142. FRENCH LITERATURE OF THE TWENTIETH CENTURY. (3, 3)

First semester: drama and poetry from Symbolism to the present time. Second semester: the contemporary novel. (Alter)

#### FRENCH 171-172. FRENCH CIVILIZATION. (3, 3)

French life, customs, culture, traditions. First semester: the historical development. Second semester: present-day France. (Cap)

#### FRENCH 195, 196, 197. HONORS READING COURSE. (3, 3, 3)

Supervised readings to be taken normally only by students admitted to Honors Program: 195 is poetry; 196 is the novel; 197 is drama. (Staff)

#### FRENCH 199. HONORS SEMINAR. (3)

Required of all students in the Honors Program. Other students will be admitted on special recommendation. Conducted in French. Discussion of a central theme with related investigations by students. (Staff)

## FOREIGN LANGUAGES AND LITERATURES

### *For Graduates*

The requirements of students will determine which courses will be offered.

- FRENCH 201. THE HISTORY OF THE FRENCH LANGUAGE. (3)  
(Mendeloff)
- FRENCH 203. COMPARATIVE ROMANCE LINGUISTICS. (3)  
Same as Spanish 203. (Mendeloff)
- FRENCH 207. ELEMENTARY OLD FRENCH. (3)  
(Mendeloff)
- FRENCH 208. OLD FRENCH PHONOLOGY AND MORPHOLOGY. (3)  
(Staff)
- FRENCH 209. MEDIEVAL FRENCH CULTURE. (3)  
(Staff)
- FRENCH 210. ELEMENTARY OLD PROVENÇAL. (3)  
(Staff)
- FRENCH 211-212. SEMINAR IN FRENCH CLASSICISM. (3, 3)  
(Quynn)
- FRENCH 220-221. THE AGE OF ENLIGHTENMENT. (3, 3)  
(Bingham)
- FRENCH 230. SEMINAR IN ROMANTICISM. (3)  
(Quynn)
- FRENCH 235-236. THE REALISTIC NOVEL IN THE NINETEENTH CENTURY.  
(3, 3)  
(Alter)
- FRENCH 243-244. THE CONTEMPORARY FRENCH THEATER. (3, 3)  
(Alter)
- FRENCH 245-246. SEMINAR IN THE CONTEMPORARY NOVEL. (3, 3)  
(Alter)
- FRENCH 251-252. THE HISTORY OF IDEAS IN FRANCE. (3, 3)  
(Rosenfield)
- FRENCH 271-272. ADVANCED WRITING AND STYLISTICS. (3, 3)  
(Alter)
- FRENCH 281-282. READING COURSE. (3, 3)  
(Staff)
- FRENCH 291-292. SEMINAR. (3, 3)  
Topic to be determined. (Staff)

## FOREIGN LANGUAGES AND LITERATURES

### FRENCH 399. RESEARCH. (1-6)

Credits determined by work accomplished. Guidance in the preparation of master's and doctoral theses. Conferences. (Staff)

### GERMAN

#### GERMAN 0. ELEMENTARY GERMAN FOR GRADUATE STUDENTS. (0 OR AUDIT)

Intensive elementary course in the German language designed particularly for graduate students who wish to acquire a reading knowledge. (Boyd)

#### GERMAN 1-2. ELEMENTARY GERMAN. (3, 3)

Each semester; given as intensive course in summer session. Three recitations and one audio-lingual drill per week. Study of linguistic structure. Extensive drill in pronunciation and conversation. (Roswell, Haberl)

#### GERMAN 3. ELEMENTARY GERMAN, HONORS COURSE. (3)

Three recitations and one audio-lingual drill per week. Enrollment limited to specially approved candidates from German 1. Student taking this course will normally continue in German 7. (Roswell)

#### GERMAN 5. REVIEW OF ELEMENTARY GERMAN. (3)

Three recitations and one audio-lingual drill per week. Limited to students who, having taken placement examination, have failed to qualify for German 6. (Sonntag)

#### GERMAN 6-7. INTERMEDIATE LITERARY GERMAN. (3, 3)

Three recitations per week; additional electronic laboratory in German 6. Given as intensive course in summer session. Prerequisite: German 2 or equivalent, or German 5, except that recommended students may enter German 7 from German 3. Usually there will be an honors section for qualified students. (Boyd, Moeller)

#### GERMAN 8. SCIENTIFIC GERMAN. (3)

Prerequisite: German 6. Reading of technical and scientific prose. (Moeller)

#### GERMAN 9. CONVERSATION AND COMPOSITION. (3)

Prerequisite: German 7, or 6 with consent of the instructor. A practical language course recommended for all students continuing in German. (Demaitre, Staff)

### *For Advanced Undergraduates*

#### GERMAN 71-72. REVIEW GRAMMAR AND COMPOSITION. (3, 3)

Prerequisite: German 7, or equivalent. A thorough study of the more detailed points of German grammar with ample practice in composition. (Vogelgesang)

#### GERMAN 75-76. SURVEY OF GERMAN LITERATURE. (3, 3)

Prerequisite: German 7, or equivalent. A survey of the chief authors and movements in German literature. (Roswell)

## FOREIGN LANGUAGES AND LITERATURES

### GERMAN 80-81. ADVANCED CONVERSATION. (3, 3)

Prerequisite: German 7 and 9, or consent of instructor. For students who wish to develop fluency and confidence in speaking the language. (Dobert)

#### *For Advanced Undergraduates and Graduates*

### GERMAN 103-104. ADVANCED COMPOSITION. (3, 3)

Translation from English into German, free composition, letter writing. (Jones, Staff)

### GERMAN 125-126. GERMAN LITERATURE OF THE EIGHTEENTH CENTURY. (3, 3)

The main works of Klopstock, Wieland, Lessing, Herder, Goethe, Schiller. (Hering, Staff)

### GERMAN 131-132. GERMAN LITERATURE OF THE NINETEENTH CENTURY. (3, 3)

Study of the literary movements from romanticism to naturalism. (Prahl, Staff)

### GERMAN 141-142. GERMAN LITERATURE OF THE TWENTIETH CENTURY. (3, 3)

Prose and dramatic writings from Gerhart Hauptmann to the present. Modern literary and philosophical movements will be discussed. (Dobert, Staff)

### GERMAN 171-172. GERMAN CIVILIZATION. (3, 3)

Study of the literary, educational, artistic traditions; great men, customs, and general culture. (Dobert, Staff)

### GERMAN 191. BIBLIOGRAPHY AND METHODS. (3)

Second semester. Especially designed for German majors. (Staff)

### GERMAN 195-196-197. HONORS READING COURSE. (3, 3, 3)

Supervised reading to be taken normally only by students admitted to Honors Program: 195 is poetry; 196 is the novel; 197 is the drama. (Staff)

### GERMAN 199. HONORS SEMINAR. (3)

Required of all students in the Honors Program. Other students will be admitted on special recommendation. Conducted in German. Discussion of a central theme with related investigations by students. (Staff)

#### *For Graduates*

The requirements of students will determine which courses will be offered.

### GERMAN 201. HISTORY OF THE GERMAN LANGUAGE. (3)

(Jones)

### GERMAN 203. GOTHIC. (3)

(Jones)

### GERMAN 204. OLD HIGH GERMAN. (3)

(Jones)

## FOREIGN LANGUAGES AND LITERATURES

- GERMAN 205. MIDDLE HIGH GERMAN. (3)  
(Jones)
- GERMAN 207. LITERATURE OF OLD HIGH GERMAN AND  
MIDDLE HIGH GERMAN. (3)  
(Jones)
- GERMAN 211-212. LITERATURE OF THE SIXTEENTH AND  
SEVENTEENTH CENTURIES. (3, 3)  
(Hering)
- GERMAN 224-225. GOETHE AND HIS TIME. (3, 3)  
(Hering)
- GERMAN 226. SCHILLER. (3)  
(Prahl)
- GERMAN 230. GERMAN ROMANTICISM. (3)  
(Prahl)
- GERMAN 234. THE GERMAN DRAMA OF THE NINETEENTH CENTURY. (3)  
(Dobert)
- GERMAN 250. THE GERMAN LYRIC. (3)  
(Hering)
- GERMAN 281-282. READING COURSE. (3, 3)  
(Dobert)
- GERMAN 291-292. SEMINAR. (3, 3)  
Topic to be determined. (Staff)
- GERMAN 399. RESEARCH. (1-6)  
Credits determined by work accomplished. Guidance in preparation of master's  
and doctoral theses. Conferences. (Staff)

## HEBREW

- HEBREW 1-2. ELEMENTARY HEBREW. (3, 3)  
Elements of grammar; pronunciation and conversation; exercises in translation.  
(Greenberg)
- HEBREW 6-7. INTERMEDIATE HEBREW. (3, 3)  
Three recitations per week; additional electronic laboratory in Hebrew 6. Pre-  
requisite, Hebrew 2 or equivalent. Texts designed to give some knowledge of  
Hebrew life, thought, and culture. (Greenberg)
- HEBREW 12-13. CONVERSATION AND COMPOSITION. (3, 3)  
Prerequisite, Hebrew 7 or equivalent. A practical language course recommended  
for all students continuing with Hebrew. (Greenberg)
- HEBREW 75-76. SURVEY OF HEBREW LITERATURE. (3, 3)  
Prerequisite, Hebrew 7 or equivalent. (Greenberg)

## FOREIGN LANGUAGES AND LITERATURES

### HEBREW 101. THE HEBREW BIBLE. (3)

Reading of selected portions of the Pentateuch. (Greenberg)

### HEBREW 102. THE HEBREW BIBLE. (3)

Reading of selected portions of the Prophets. (Greenberg)

### HEBREW 103. MODERN HEBREW LITERATURE. (3)

The period of the Haskalah (Enlightenment). (Greenberg)

### HEBREW 104. MODERN HEBREW LITERATURE. (3)

The period of the Tehiah (Modern Revival). (Greenberg)

## ITALIAN

### ITALIAN 1-2. ELEMENTARY ITALIAN. (3, 3)

Three recitations and one laboratory hour per week. Elements of grammar and exercises in translation. (Motta)

### ITALIAN 6-7. INTERMEDIATE ITALIAN. (3, 3)

Three recitations per week; additional electronic laboratory in Italian 6. Prerequisite, Italian 2 or equivalent. Reading of texts designed to give some knowledge of Italian life, thought, and culture. (Motta)

### ITALIAN 75-76. SURVEY OF ITALIAN LITERATURE. (3, 3)

Prerequisite, Italian 7 or equivalent. Basic survey of history of Italian literature. (Motta)

## RUSSIAN

### RUSSIAN 1-2. ELEMENTARY RUSSIAN. (3, 3)

Three recitations and one laboratory hour per week. Elements of grammar, pronunciation and conversation; exercises in translation. (Hitchcock, Staff)

### RUSSIAN 6-7. INTERMEDIATE RUSSIAN. (3, 3)

Three recitations per week; additional electronic laboratory in Russian 6. Prerequisite, Russian 2 or equivalent. Reading of texts designed to give some knowledge of Russian life, thought and culture. (Hitchcock, Staff)

### RUSSIAN 10. SCIENTIFIC RUSSIAN. (3)

Prerequisite, Russian 7 or equivalent. Reading of technical and scientific prose. (Hitchcock)

### RUSSIAN 12-13. CONVERSATION AND COMPOSITION. (3, 3)

Prerequisite, Russian 7 or equivalent. A practical language course recommended for all students continuing in Russian. (Hitchcock)

### RUSSIAN 71-72. REVIEW GRAMMAR AND COMPOSITION. (3, 3)

Prerequisite, Russian 7 or equivalent. Designed to give a thorough training in the structure of the language; drill in Russian composition.

(Hitchcock, Staff)

## FOREIGN LANGUAGES AND LITERATURES

### RUSSIAN 75-76. SURVEY OF RUSSIAN LITERATURE. (3, 3)

Prerequisite, Russian 7 or equivalent. An elementary survey of Russian literature. (Hitchcock)

### RUSSIAN 80-81. ADVANCED CONVERSATION. (3, 3)

Prerequisite, Russian 12, 13, or consent of instructor. For students who wish to develop fluency and confidence in speaking the language. (Hitchcock, Staff)

#### *For Advanced Undergraduates and Graduates*

### RUSSIAN 103-104. ADVANCED COMPOSITION. (3, 3)

(Hitchcock)

### RUSSIAN 125. RUSSIAN LITERATURE OF THE 18TH CENTURY. (3, 3)

(Hitchcock)

### RUSSIAN 135. MODERN RUSSIAN POETRY. (3)

(Hitchcock)

### RUSSIAN 136. MODERN RUSSIAN DRAMA. (3)

(Hitchcock)

### RUSSIAN 137. MODERN RUSSIAN FICTION. (3)

(Hitchcock)

### RUSSIAN 141, 142. SOVIET RUSSIAN LITERATURE. (3, 3)

(Hitchcock)

## SPANISH

### SPANISH 1-2. ELEMENTARY SPANISH. (3, 3)

Each semester; given as intensive course in summer session. Three recitations and one laboratory hour per week. Study of linguistic structure and development of audio-lingual and writing ability. (Rovner, Staff)

### SPANISH 3. ELEMENTARY SPANISH, HONORS COURSE. (3)

Three recitations and one laboratory hour per week. Enrollment limited to specially approved candidates from Spanish 1. Students taking this course will normally continue in Spanish 7. (Rovner)

### SPANISH 5. REVIEW OF ELEMENTARY SPANISH. (3)

Three recitations and one laboratory hour per week. Enrollment limited to students who, having taken the placement examination, have failed to qualify for Spanish 6. (Rentz, Staff)

### SPANISH 6-7. INTERMEDIATE SPANISH. (3, 3)

Three recitations per week; additional electronic laboratory in Spanish 6. Given as intensive course in summer session. Prerequisite: Spanish 2 or equivalent, or Spanish 5, except that recommended students may enter Spanish 7 from Spanish 3. Study of linguistic structure, further development of audio-lingual and writing ability, and reading of literary texts with discussion in Spanish. Usually there will be an honors section for qualified students.

(Font, Armstrong)

## FOREIGN LANGUAGES AND LITERATURES

### SPANISH 11. INTRODUCTION TO SPANISH LITERATURE. (3)

Prerequisite, Spanish 7. Required of all students who continue in advanced courses of Department, with the exception of superior students who are permitted to bypass an introduction to Spanish literature. Conducted in Spanish. Reading of literary texts, discussion, and brief essays. (Panico)

### SPANISH 12. REVIEW OF ORAL AND WRITTEN SPANISH. (3)

Prerequisite, Spanish 7. A practical language course recommended for all students continuing in Spanish. May be taken concurrently with Spanish 11. (Panico)

### *For Advanced Undergraduates*

### SPANISH 41-42. SPANISH PHONETICS. (1, 1)

Prerequisite, Spanish 7 or equivalent. Descriptive study of the Spanish sound system. Practice in phonetic perception, transcription and articulation. Particular attention to sentence phonetics; juncture, rhythm, stress, pitch. (Mendeloff)

### SPANISH 51-52. COMMERICAL SPANISH. (3, 3)

Prerequisite, Spanish 12 and consent of instructor. Designed to give a knowledge of correct Spanish usage, commercial letters and business forms. Fundamental principles of Spanish shorthand will be included if warranted by the interest and ability of the class. (Rovner, Mur)

### SPANISH 71-72. REVIEW GRAMMAR AND COMPOSITION. (3, 3)

Prerequisite, Spanish 11 and 12 or equivalent. Intended to give an intensive and practical drill in Spanish composition. (Armstrong)

### SPANISH 75-76. SURVEY OF SPANISH LITERATURE. (3, 3)

Prerequisite, Spanish 11 or equivalent. Basic survey of the history of Spanish literature. (Parsons, Rand)

### SPANISH 77-78. SURVEY OF SPANISH-AMERICAN LITERATURE. (3, 3)

Prerequisite, Spanish 11 or equivalent. Basic survey of the history of Spanish-American literature. (Rovner)

### SPANISH 80-81. ADVANCED CONVERSATION. (3, 3)

Prerequisite, Spanish 11 and 12 or consent of instructor. For students who wish to develop fluency and confidence in speaking the language. (Nemes)

### *For Advanced Undergraduates and Graduates*

### SPANISH 101. APPLIED LINGUISTICS. (3)

Nature of Applied Linguistics and its contribution to the effective teaching of foreign languages. Comparative study of English and Spanish with emphasis upon points of divergence. Analysis, evaluation, and construction of related drills. (Mendeloff)

### SPANISH 103-104. ADVANCED COMPOSITION. (3, 3)

Training in self-expression in Spanish, free composition, writing and speaking. (Panico)

## FOREIGN LANGUAGES AND LITERATURES

### SPANISH 107. INTRODUCTION TO MEDIEVAL LITERATURE. (3)

Spanish literary history from the eleventh through the fifteenth century. Selective readings from representative texts. (Mendeloff, Parsons)

### SPANISH 111. POETRY OF THE SIXTEENTH AND SEVENTEENTH CENTURIES. (3)

Renaissance, mystics, and baroque poetry. (Goodwyn, Rand)

### SPANISH 112. PROSE OF THE SIXTEENTH AND SEVENTEENTH CENTURIES. (3)

Selected readings in the pastoral, sentimental, picaresque novel and in the Romances of Chivalry. (Goodwyn)

### SPANISH 113. DRAMA OF THE SIXTEENTH AND SEVENTEENTH CENTURIES. (3)

Selected plays of Lope de Vega, Calderon de la Barca, Tirso de Molina, and others. (Parsons, Rovner)

### SPANISH 114. LOPE DE VEGA. (3)

Selected works of Lope de Vega. (Parsons, Rovner)

### SPANISH 115-116. CERVANTES. (3, 3)

Drama, Exemplary Novels and Don Quixote. (Goodwyn, Rand)

### SPANISH 125. LITERATURE OF THE EIGHTEENTH CENTURY. (3)

Reform and neo-classicism: Feijoo and Luzan. (Goodwyn)

### SPANISH 131. NINETEENTH CENTURY FICTION. (3)

Reading of some of the significant novels of the nineteenth century. (Parsons, Rand)

### SPANISH 135. MODERN SPANISH POETRY. (3)

Significant poets of the nineteenth and twentieth centuries. (Nemes, Rand)

### SPANISH 136. MODERN SPANISH DRAMA. (3)

Significant plays of the nineteenth and twentieth centuries. (Parsons, Rand)

### SPANISH 141-142. LITERATURE OF THE TWENTIETH CENTURY. (3, 3)

First semester: Modern Spanish thought in the Generation of 1898 and after.  
Second semester: the contemporary Spanish novel. (Rand)

### SPANISH 161. SPANISH-AMERICAN FICTION. (3)

The novel and short story from the Wars of Independence to the present and their reflection of society in the Hispanic republics of the Western Hemisphere. (Nemes, Rovner)

### SPANISH 162. SPANISH-AMERICAN POETRY. (3)

Representative poetry after 1800 and its relation to European trends and writers. (Nemes, Rovner)

### SPANISH 163. SPANISH-AMERICAN ESSAY. (3)

Social and political thought from Bolivar to Vasconcelos and its relationship to social and political conditions in Spanish America. (Nemes, Rovner)

## FOREIGN LANGUAGES AND LITERATURES

### SPANISH 171-172. SPANISH CIVILIZATION. (3, 3)

A survey of two thousand years of Spanish history, outlining the cultural heritage of the Spanish people, their great men, traditions, customs, art and literature, with special emphasis on the interrelationship of social and literary history. (Rand)

### SPANISH 173-174. LATIN-AMERICAN CIVILIZATION. (3, 3)

Introductory survey of the cultures of Latin America; the historical-political background and the dominating concepts in the lives of the people. (Nemes, Rovner)

### SPANISH 195-196-197. HONORS READING COURSE. (3, 3, 3)

Supervised reading to be taken normally only by students admitted to Honors Program: 195 is poetry; 196 is the novel; 197 is the drama. (Staff)

### SPANISH 199. HONORS SEMINAR. (3)

Required of all students in the Honors Program. Other students will be admitted on special recommendation. Conducted in Spanish. Discussion of a central theme with related investigations by students. (Staff)

### *For Graduates*

The requirements of students will determine which courses will be offered.

### SPANISH 201. THE HISTORY OF THE SPANISH LANGUAGE. (3)

(Mendeloff)

### SPANISH 203. COMPARATIVE ROMANCE LINGUISTICS. (3)

(Mendeloff)

### SPANISH 207. MEDIEVAL SPANISH LITERATURE. (3)

(Mendeloff, Parsons)

### SPANISH 215-216. SEMINAR: THE GOLDEN AGE IN SPANISH LITERATURE. (3, 3)

(Goodwyn, Parsons, Rovner)

### SPANISH 233. THE NOVEL OF THE NINETEENTH CENTURY. (3)

(Goodwyn, Parsons)

### SPANISH 234. THE DRAMA OF THE NINETEENTH CENTURY. (3)

(Goodwyn, Parsons)

### SPANISH 237-238. SEMINAR IN HISPANIC POETRY (NINETEENTH AND TWENTIETH CENTURIES). (3, 3)

(Nemes, Rand, Goodwyn)

### SPANISH 241-242. SPANISH PROSE OF THE TWENTIETH CENTURY. (3, 3)

(Rand)

### SPANISH 245. THE DRAMA OF THE TWENTIETH CENTURY. (3)

(Rand)

## GENERAL BIOLOGICAL SCIENCES

- SPANISH 263. COLONIAL SPANISH-AMERICAN LITERATURE. (3)  
(Nemes)
- SPANISH 264. NATIONAL SPANISH-AMERICAN LITERATURE,  
SEMINAR. (3)  
(Nemes)
- SPANISH 281-282. READING COURSE. (3, 3)  
(Staff)
- SPANISH 291-292. SEMINAR. (3, 3)  
Topic to be determined. (Staff)
- SPANISH 399. RESEARCH. (1-6)  
Credits determined by work accomplished. Guidance in the preparation of  
master's and doctoral theses. Conferences. (Staff)

## GENERAL BIOLOGICAL SCIENCES

The program has been prepared for the student who is interested in biology but whose interest has not yet centered in any one of the biological sciences. It is suitable for the pre-dental or pre-medical student who plans to earn the B.S. degree before entering professional school. The program includes work in botany, entomology, microbiology, and zoology, and introduces the student to the general principles and methods of each of these biological sciences. The student may then emphasize one of these areas in completing his program.

By proper selection of courses during the junior and senior years, a student may concentrate his work sufficiently in one area of biology to be able to continue graduate work in that field. However, a student who is planning to do graduate work should major in one specific field of biology.

The student following this program must meet the general requirements for a degree in the College of Arts and Sciences. He should select French or German to meet the foreign language requirements and Speech 7 (or Speech 1) to fulfill the requirement in speech.

Required introductory courses in the biological sciences: Bot. 1; Ent. 1; Microb. 1; Zool. 1. These courses must be passed with an average grade of at least "C." The pre-professional student must take Zool. 2 as well.

Required supporting courses in mathematics and physical sciences: Math. 10, 11; Chem. 1, 3; Phys. 10, 11. The student working in most areas of biology will also need a year of organic chemistry (Chem. 31, 33, or Chem. 35, 36, 37, 38). Additional work in chemistry may also be required by the student's adviser, in accordance with the needs of the student's field of emphasis. The pre-professional student must include Chem. 35, 36, 37, 38 in his program.

Advanced courses in the biological sciences: The student must complete at least 30 semester hours of advanced work selected from the fields of botany,

## GENERAL PHYSICAL SCIENCES AND GEOGRAPHY

entomology, microbiology, and zoology. Of these credits at least 18 must be at the 100 level and taken in at least two of the four departments. The following courses in psychology may be counted as part of the required 30 semester hours but may not be used to satisfy the requirement of 18 semester hours at the 100 level: Psych. 106, 136, 145, 180, 181, 195.

A junior or senior following this curriculum will be advised by the department in which he plans to do the most work.

## GENERAL PHYSICAL SCIENCES

This program has been prepared for the student who desires an introduction to the physical sciences but whose interest has not yet centered in any one field of the physical sciences. The program includes work in chemistry, mathematics, and physics, and permits the student to emphasize one of these fields without having to meet the full requirements for a major in one specific field. The program is not recommended for students who may later do graduate work in mathematics or in one of the physical sciences.

The student following this program must meet the general requirements for a degree in the College of Arts and Sciences. He should select French, Russian or German to meet the foreign language requirement and Speech 7 (or Speech 1) to fulfill the requirement in speech.

Required introductory courses in mathematics and the physical sciences: Math. 19; Chem. 1, 3; Phys. 10, 11 (or 20, 21 or 15, 16). These courses must be passed with an average grade of at least "C" for the student to be eligible to continue with the program.

Advanced courses in mathematics and the physical sciences: The student must complete at least 36 semester hours of advanced work selected from the Departments of Chemistry, Mathematics, and Physics. Of these credits at least 18 must be at the 100 level and taken in at least two of the three departments with no less than three the second department. The student should normally take Calculus (Math. 20, 21) inasmuch as practically all the advanced work in mathematics and physics requires calculus.

## GEOGRAPHY

Geography is a recognized major field in Arts and Sciences leading to the B.A. degree, although the Department is administered by the College of Business and Public Administration. Freshmen and sophomores wishing to major in geography should consult their lower division advisers and the Department of Geography. The following courses are required for a major: Geog. 10 and 11—General Geography (3, 3); Geog. 30—Principles of Morphology (3); Geog. 35—Map Interpretations and Map Problems (3); Geog. 40—Principles of Meteorology (3); Geog. 41—Introductory Climatology (3); Geog. 170—Local Field Course (3); Geog. 199—Undergraduate Thesis Research (3); and 15 hours in other geography courses

numbered 100 to 198. Descriptions of courses in geography will be found in the catalog of the College of Business and Public Administration.

The following supporting courses in science are required: Bot. 1 (4); Chem. 1 (4); Agron. 114 (4). The following supporting courses are also required: Bot. 113 (2); Econ. 31 and 32 (3, 3); Soc. 105 (3). Certain of these courses are applicable to the minor. Please consult Senior Adviser, Department of Geography.

## GOVERNMENT AND POLITICS

Although this Department is administered by the College of Business and Public Administration, government and politics is a recognized major field for students in the College of Arts and Sciences, leading to the B.A. degree. Freshmen wishing to major in government and politics should consult their Lower Division advisers about preparation for the major; additional information about the government and politics program may be obtained at the Departmental office.

Arts and Sciences students may pursue the general G. & P. curriculum or the more specialized International Affairs curriculum. (Only BPA students may pursue a specialized curriculum in Public Administration.)

Government and Politics majors must take a minimum of 36 semester hours in Government and Politics and may not count more than 42 hours in G. & P. toward graduation. No course with a grade less than "C" may be used to satisfy major requirements.

The Government and Politics fields are as follows: (1) American Government and Politics; (2) Comparative Government; (3) International Affairs; (4) Political Theory; (5) Public Administration; (6) Public Law; and (7) Public Policy and Political Behavior.

All G. & P. majors are required to take G. & P. 1—American Government (3); G. & P. 3—Principles of Government and Politics (3); G. & P. 20—Introduction to Political Behavior (3); and G. & P. 141—History of Political Theory (3) or G. & P. 142—Recent Political Theory (3). They must also take one G. & P. course from three separate fields exclusive of Political Theory. In addition (a) G. & P. majors (general) must take at least 15 G. & P. semester hours at the 100 level; (b) G. & P. majors taking the International Affairs curriculum must complete at least 15 semester hours at the 100 level in international affairs and comparative government courses, including G. & P. 101—International Political Relations (3).

All students majoring in G. & P. (general) must take a minimum of 12 semester hours in one foreign language. Students majoring in G. & P. with specialization in International Affairs must take a minimum of 12 semester hours in one foreign language *above the first year elementary course*. (The first year elementary requirement may be waived by high school credit or placement tests.)

## HISTORY

All students majoring in G. & P. must fulfill the requirements of a minor. The general requirement is the completion of 18 semester hours from approved Arts and Sciences departments other than G. & P. At least six of the 18 hours must be taken at the 100 level from a single department. Students majoring in G. & P. with specialization in International Affairs may choose to take all minor courses in geographical area studies or may take them all on a departmental basis.

Descriptions of courses in government and politics will be found in the catalog of the College of Business and Public Administration.

## HISTORY

*Professor and Head:* SHANNON.

*Professors:* BAUER, COLE, GORDON, JASHEMSKI, KOCH, LAND, MERRILL, PRANGE, SPARKS AND STROMBERG.

*Visiting Professor:* MAIN.

*Associate Professors:* CALLCOTT, CONKIN, GLAD AND RIVLIN.

*Assistant Professors:* BRESLOW, FOLSOM, GIFFIN, GREENBERG, ROBERTSON, SILBEY AND YANEY.

*Lecturers:* BEVERIDGE, DYSON, ISAACS, MATOSSIAN, PIAZZA AND WEINSTEIN.

*Instructor:* VAN NESS.

The Department of History recognizes that the study of history supplies the general student with the cultural background for the several fields of knowledge. At the same time the curriculum provides preparation for those entering specific fields of professional activity: (1) the teaching of history and the social sciences at the secondary level, (2) journalism, (3) research and archival work, (4) the diplomatic service. In addition, the curriculum offers adequate preparation and training for those who intend to pursue graduate study.

The program of the undergraduate student majoring in history is planned to insure a diversification of courses with the aim of familiarizing the student with the subject matter and disciplines of the broad fields of history. A faculty adviser, designated by the Department, will assist each undergraduate major in planning his program and in selecting courses to meet both major and minor requirements. The student will be expected to confer at regular intervals with his faculty adviser regarding the progress of his studies.

Undergraduate history majors must meet the following departmental requirements:

1. Prerequisites for majors are Hist. 21, 22 (Hist. 23, 24 may be substituted in special cases) and Hist. 41, 42.
2. Every major is required to complete a minimum of 27 additional semester hours in the series, Hist. 31 to Hist. 199.
3. Every history major is required to complete the proseminar course, Hist. 199, three semester hours.
4. The remaining 24 hours of major work in advanced courses must show the following minimum distribution: (a) 9 hours in American history (including Latin American and Canadian) and (b) nine hours in European and Asian history.
5. No course with a grade less than "C" may be used to satisfy major requirements.
6. Completion of the minor.

The undergraduate major will, during his junior year, file with his faculty adviser a minor sequence. The minor requirement may be satisfied by (1) a single sequence of 18 semester hours in any one of several related departments such as government and politics, economics, sociology, philosophy, literature, and geography; or (2) a split minor sequence to include two departments, provided a minimum of nine hours is offered in each department, a total of 18 hours. In certain cases, and only on the basis of an approved written application, the student may offer a combination social science minor sequence of at least 18 hours or a combination humanities minor sequence of at least 18 hours. In all cases the minor sequence must include at least six semester hours of 100-level work in a single department. The average grade in the minor must be "C" or better.

**HONORS IN HISTORY:** Students who major in history may apply for admission to the History Honors Program during the second semester of their sophomore year. Those who are admitted to the program substitute discussion courses and a thesis for some of their required lecture courses, and they take an oral and written comprehensive examination prior to graduation. Successful candidates are awarded either honors or high honors in history.

The History Department offers *pre-honors* work in American history (History 57, 58) and *pre-honors* sections in Western Civilization (History 41, 42). Students in these sections meet in a discussion group instead of attending lectures. They read widely and do extensive written work on their own. Pre-honors sections are open to any student, subject only to the instructor's approval. Students who intend to apply for admission to the History Honors Program should take as many of them as possible during their freshman and sophomore years.

**GENERAL EDUCATION REQUIREMENTS IN HISTORY:** The courses with numbers up to 100 (except History 57 and 58) are particularly

## HISTORY

recommended to students seeking to meet the General Education requirements. These courses are especially designed for the student who wishes to enrich his knowledge and understanding of a particular society or culture in a comparatively broad chronological framework, even though he might have no professional interest in history. They may be taken during the sophomore, junior or senior years.

Students with an exceptionally good background in history may substitute 100-level courses where there are no stated prerequisites.

### HIST. 21. HISTORY OF THE UNITED STATES TO 1865. (3)

A survey of the history of the United States from colonial times to the end of the Civil War. Emphasis on the establishment and development of American institutions. (American History Staff)

### HIST. 22. HISTORY OF THE UNITED STATES SINCE 1865. (3)

A survey of economic, social, intellectual, and political developments since the Civil War. Emphasis on the rise of industry and the emergence of the United States as a world power. (American History Staff)

### HIST. 23. SOCIAL AND CULTURAL HISTORY OF EARLY AMERICA. (3)

A study of the social and cultural history of the United States as a predominantly agricultural society. Examination of how the social milieu shapes the cultural development of the nation and its institutions.

(American History Staff)

### HIST. 24. SOCIAL AND CULTURAL HISTORY OF MODERN AMERICA. (3)

A study of the social and cultural history of the United States as a society in transition. Examination of the social and cultural changes that accompanied industrial and scientific development.

(American History Staff)

### HIST. 29. THE UNITED STATES IN WORLD AFFAIRS. (3)

A study of the United States as an emerging world power and the American response to changing status in world affairs. Emphasis on the relationship between internal and external development of the nation.

(American History Staff)

### HIST. 31, 32. LATIN AMERICAN HISTORY. (3, 3)

A survey of the history of Latin America from colonial origins to the present, covering political, cultural, economic, and social development, with special emphasis upon relations with the United States. First semester: Colonial Latin America. Second semester: the Republics.

(Latin American History Staff)

### HIST. 41, 42. WESTERN CIVILIZATION. (3, 3)

This course is designed to give the student an appreciation of the civilization in which he lives in its broadest setting. The study begins with the collapse of classical civilization and comes to the present.

(European History Staff)

### HIST. 51, 52. THE HUMANITIES. (3, 3)

In surveying history from prehistoric times to the present, man's cultural development is emphasized. The course is a study of the achievements of the various civilizations which have contributed to the common cultural heritage

of western civilization. It is designed as an introductory course in history which will make a more direct contribution to the other liberal art fields. First semester, to the Renaissance. Second semester, since the Renaissance.

(Jashemski)

## HIST. 53, 54. HISTORY OF ENGLAND AND GREAT BRITAIN. (3, 3)

A history of the development of British life and institutions. Open to all classes. Especially recommended for English majors and minors and pre-law students. First semester, to 1485. Second semester, since 1485.

(Gordon)

## HIST. 57. PRE-HONORS COLLOQUIUM IN EARLY AMERICAN HISTORY. (3)

Selected readings in modern American history with emphasis on independent discussion and writing. May be taken for credit by students exempt from American history. Permission of instructor required.

(American History Staff)

## HIST. 58. PRE-HONORS COLLOQUIUM IN MODERN AMERICAN HISTORY. (3)

Selected readings in modern American history with emphasis on independent study, discussion and writing. May be taken for credit by students exempt from American history. Permission of instructor required.

(American History Staff)

## HIST. 61, 62. FAR EASTERN CIVILIZATION. (3, 3)

This course seeks to give the student an understanding of a great civilization radically different from our own, and an appreciation of the complex problems of the Far East and of American policy there. The approach is interdisciplinary within an historical framework.

(Folsom)

## HIST. 71, 72. ISLAMIC CIVILIZATION. (3, 3)

This course seeks to give the student an insight into a cultural heritage that dominates the lives of over four hundred million people today. The study covers Islam in Spain, North Africa, Africa below the Sahara, India, and Indonesia as well as the Middle East. The approach is humanistic within an historical framework.

(Rivlin)

### *For Advanced Undergraduates and Graduates*

## AMERICAN HISTORY

### HIST. 101. AMERICAN COLONIAL HISTORY. (3)

The settlement and development of colonial America to the middle of the eighteenth century.

(Land)

### HIST. 102. THE AMERICAN REVOLUTION. (3)

The background and course of the American Revolution through the formation of the Constitution.

(Staff)

### HIST. 103. THE FORMATIVE PERIOD IN AMERICA, 1789-1824. (3)

The evolution of the Federal government, the origins of political parties, problems of foreign relations in an era of international conflict, beginnings of the industrial revolution in America, and the birth of sectionalism.

(Staff)

### HIST. 105. SOCIAL AND ECONOMIC HISTORY OF THE UNITED STATES TO 1865. (3)

A synthesis of American life from Independence through the Civil War.

(Staff)

## HISTORY

### HIST. 106. SOCIAL AND ECONOMIC HISTORY OF THE UNITED STATES SINCE THE CIVIL WAR. (3)

The development of American life and institutions, with emphasis upon the period since 1876. (Staff)

### HIST. 114. THE MIDDLE PERIOD OF AMERICAN HISTORY, 1824-1860. (3)

An examination of the political history of the United States from Jackson to Lincoln with particular emphasis on the factors producing Jacksonian democracy, Manifest Destiny, the Whig Party, the anti-slavery movement, the Republican Party, and secession. (Sparks)

### HIST. 115. THE OLD SOUTH. (3)

Prerequisite, six credits of American history. A study of the institutional and cultural life of the ante-bellum South with particular reference to the background of the Civil War. (Callcott)

### HIST. 116. THE CIVIL WAR. (3)

Military aspects; problems of the Confederacy; political, social, and economic effects of the war upon American society. (Sparks)

### HIST. 118, 119. RECENT AMERICAN HISTORY. (3, 3)

Party policies, domestic issues, foreign relations of the United States since 1890. First semester, to 1929. Second semester, since 1929. (Merrill, Glad)

### HIST. 121. HISTORY OF THE AMERICAN FRONTIER. (3)

The Trans-Allegheny West. The westward movement into the Mississippi Valley. (Staff)

### HIST. 124. RECONSTRUCTION AND THE NEW NATION, 1865-1896. (3)

Prerequisite, six credits of American history, or permission of instructor. Problems of construction in both South and North. Emergence of big business and industrial combinations. Problems of the farmer and laborer. (Staff)

### HIST. 127, 128. DIPLOMATIC HISTORY OF THE UNITED STATES. (3, 3)

A historical study of the diplomatic negotiations and foreign relations of the United States. First semester, from the Revolution to the Civil War. Second semester, from the Civil War to the present. (Cole)

### HIST. 129. THE UNITED STATES AND WORLD AFFAIRS. (3)

A consideration of the changed position of the United States with reference to the rest of the world since 1917. (Cole)

### HIST. 133, 134. THE HISTORY OF IDEAS IN AMERICA. (3, 3)

A history of basic beliefs about religion, man, nature, and society. Consent of the instructor is required for H. 134. (Conkin)

### HIST. 135, 136. CONSTITUTIONAL HISTORY OF THE UNITED STATES. (3, 3)

A study of the historical forces resulting in the formation of the Constitution, and development of American constitutionalism in theory and practice thereafter. (Staff)

## HIST. 141, 142. HISTORY OF MARYLAND. (3, 3)

First semester, a survey of the political, social and economic history of colonial Maryland. Second semester, Maryland's historical development and role as a state in the American Union. (Staff)

## HIST. 147. HISTORY OF MEXICO AND THE CARIBBEAN. (3)

The history of Mexico and the Caribbean with special emphasis upon the independence period and upon relations between ourselves and our nearest Latin American neighbors. (Staff)

## HIST. 148. HISTORY OF CANADA. (3)

Prerequisites, H. 41, 42, or H. 53, 54. A history of Canada, with special emphasis on the nineteenth century and upon Canadian relations with Great Britain and the United States. (Gordon)

## HIST. 149. HISTORY OF BRAZIL. (3)

The history of Brazil with emphasis on the national period. (Giffin)

## HIST. 150. HISTORY OF ARGENTINA AND THE ANDEAN REPUBLICS. (3)

The history of the nationalist period of selected South American countries. (Staff)

# EUROPEAN HISTORY

## HIST. 151. HISTORY OF THE ANCIENT ORIENT AND GREECE. (3)

A survey of the ancient civilizations of Egypt, the Near East, and Greece, with particular attention to their institutions, life, and culture. (Jashemski)

## HIST. 153. HISTORY OF ROME. (3)

A study of Roman civilization from the earliest beginnings through the Republic and down to the last centuries of the Empire. (Jashemski)

## HIST. 155, 156. HISTORY OF MEDIEVAL EUROPE. (3, 3)

A study of medieval government, society, and thought from the collapse of classical civilization to the Renaissance. (Robertson)

## HIST. 157. THE AGE OF ABSOLUTISM, 1648-1748. (3)

Europe in the Age of Louis XIV and the Enlightened Despots. (Staff)

## HIST. 158. THE OLD REGIME AND THE FRENCH REVOLUTION, 1748-1815. (3)

Europe in the era of the French Revolution. (Staff)

## HIST. 159, 160. HISTORY OF EUROPEAN IDEAS. (3, 3)

Prerequisites, H. 41, 42 or H. 53, 54, or the equivalent. Beginning with a review of the basic Western intellectual traditions as a heritage from the Ancient World, the courses will present selected important currents of thought from the scientific revolution of the sixteenth and seventeenth centuries down to the twentieth century. First semester, through the eighteenth century. Second semester, nineteenth and twentieth centuries. (Stromberg)

## HIST. 161. THE RENAISSANCE AND REFORMATION. (3)

Prerequisite, H. 41, 42, or 53, or the permission of the instructor. The culture of the Renaissance, the Protestant revolt and Catholic reaction through the Thirty Years' War. (Breslow)

## HISTORY

### HIST. 163, 164. HISTORY OF THE BRITISH EMPIRE. (3, 3)

Prerequisites, H. 41, 42, or H. 53, 54. First semester, the development of England's Mercantilist Empire and its fall in the war for American Independence (1783). Second semester, the rise of the Second British Empire and the solution of the problem of responsible self-government (1783-1867), the evolution of the British Empire into a Commonwealth of Nations, and the development and problems of the dependent Empire. (Gordon)

### HIST. 165. CONSTITUTIONAL HISTORY OF GREAT BRITAIN. (3)

A survey of constitutional development in England with emphasis on the real property aspects of feudalism, the growth of the common law, the development of Parliament, and the expansion of liberties of the individual. (Gordon)

### HIST. 166. TUDOR-STUART ENGLAND. (3)

An examination of the political, religious and social forces in English life from 1485-1714 with special emphasis on Tudor government, the English Reformation, the Elizabethan era, Puritanism, and the English revolution. (Breslow)

### HIST. 167, 168. HISTORY OF RUSSIA. (3, 3)

A history of Russia from earliest times to 1917. (Yaney)

### HIST. 169, 170. EUROPE IN THE NINETEENTH CENTURY, 1815-1919. (3, 3)

Prerequisites, H. 41, 42, or H. 53, 54. A study of the political, economic, social and cultural development of Europe from the Congress of Vienna to the First World War. (Bauer)

### HIST. 171, 172. EUROPE IN THE WORLD SETTING OF THE TWENTIETH CENTURY. (3, 3)

Prerequisites, H. 41, 42, or H. 53, 54. A study of political, economic, and cultural developments in twentieth century Europe with special emphasis on the factors involved in the two World Wars and their global impacts and significance. (Prange)

### HIST. 173. THE SOVIET UNION. (3)

A history of the Bolshevik Revolution and the founding of the Soviet Union; the economic policy and foreign policy of the U.S.S.R. to the present. (Yaney)

### HIST. 175. MODERN FRANCE. (3)

A survey of French history from 1815 to the present. The emphasis is upon such topics as the population problem, the economic and social structure of French society, and the changing political and cultural values of this society in response to recurrent crises through the nineteenth and twentieth centuries. (Greenberg)

## ASIAN HISTORY

### HIST. 181, 182. THE MIDDLE EAST. (3, 3)

Prerequisites, six hours from the following groups of courses: H. 41, 42; H. 51, 52; or H. 53, 54. A survey of the historical and institutional developments of the nations of this vital area. The Islamic Empires and their cultures; impact of the west; breakup of the Ottoman Empire and rise of nationalism; present day problems. (Rivlin)

**HIST. 183. THE CONTEMPORARY MIDDLE EAST. (3)**

H. 181 or 182 recommended though not required. The development of middle eastern institutions in the nineteenth and twentieth centuries with reference to the emergence of contemporary states and their place in world affairs. (Rivlin)

**HIST. 187, 188. HISTORY OF CHINA. (3, 3)**

A history of China from earliest times to the present. The emphasis is on the development of Chinese institutions that have molded the life of the nation and its people. (Folsom)

**HIST. 189. HISTORY OF JAPAN. (3)**

A history of Japan from earliest to modern times. Emphasis is placed on the evolution of institutions and thought. (Folsom)

**HIST. 195, 196. HONORS COLLOQUIUM. (3, 3)**

Enrollment limited to students admitted by the departmental Honors Committee. Reading in sources and secondary work centering about the development of the modern world. Discussions of reading and written work in weekly seminar meetings. (Staff)

**HIST. 198. HONORS THESIS. (3)**

Limited to students who have completed H. 195. Normally repeated for a total of six hours credit during the senior year by candidates for honors in history. (Staff)

**HIST. 199. PROSEMINAR IN HISTORICAL WRITING. (3)**

Discussions and research papers designed to acquaint the student with the methods and problems of research and presentation. The student will be encouraged to examine those phases of history which he regards as his specialties. (Staff)

*For Graduates***HIST. 300. HISTORIOGRAPHY: TECHNIQUES OF HISTORICAL RESEARCH AND WRITING. (3)**

(Staff)

**HIST. 301. READINGS IN COLONIAL AMERICAN HISTORY. (3)**

(Land)

**HIST. 302. SEMINAR IN COLONIAL AMERICAN HISTORY. (3)**

(Land)

**HIST. 303. READINGS IN THE AMERICAN REVOLUTION AND THE FORMATIVE PERIOD. (3)**

(Staff)

**HIST. 304. SEMINAR IN THE AMERICAN REVOLUTION AND THE FORMATIVE PERIOD. (3)**

(Staff)

**HIST. 305. READINGS IN AMERICAN SOCIAL AND ECONOMIC HISTORY. (3)**

(Staff)

## HISTORY

- HIST. 306. SEMINAR IN AMERICAN SOCIAL AND ECONOMIC HISTORY. (3)  
(Staff)
- HIST. 313. READINGS IN SOUTHERN HISTORY. (3)  
(Callcott)
- HIST. 314. SEMINAR IN SOUTHERN HISTORY. (3)  
(Callcott)
- HIST. 315. READINGS IN THE MIDDLE PERIOD AND CIVIL WAR. (3)  
(Sparks)
- HIST. 316. SEMINAR IN THE MIDDLE PERIOD AND CIVIL WAR. (3)  
(Sparks)
- HIST. 317. READINGS IN RECONSTRUCTION AND THE NEW NATION. (3)  
(Staff)
- HIST. 318. SEMINAR IN RECONSTRUCTION AND THE NEW NATION. (3)  
(Staff)
- HIST. 323. READINGS IN RECENT AMERICAN HISTORY. (3)  
(Merrill, Glad)
- HIST. 324. SEMINAR IN RECENT AMERICAN HISTORY. (3)  
(Merrill, Glad)
- HIST. 327. READINGS IN THE HISTORY OF AMERICAN FOREIGN POLICY.  
(3)  
(Cole)
- HIST. 328. SEMINAR IN THE HISTORY OF AMERICAN FOREIGN POLICY.  
(3)  
(Cole)
- HIST. 333. READINGS IN AMERICAN INTELLECTUAL HISTORY. (3)  
(Conkin)
- HIST. 334. SEMINAR IN AMERICAN INTELLECTUAL HISTORY. (3)  
(Conkin)
- HIST. 336. SEMINAR IN AMERICAN CONSTITUTIONAL AND POLITICAL  
HISTORY. (3)  
(Staff)
- HIST. 342. SEMINAR IN THE HISTORY OF MARYLAND. (3)  
(Staff)
- HIST. 345. READINGS IN LATIN AMERICAN HISTORY. (3)  
(Griffin)
- HIST. 346. SEMINAR IN LATIN AMERICAN HISTORY. (3)  
(Griffin)

## HISTORY

- HIST. 351. SEMINAR IN GREEK HISTORY. (3)  
(Jashemski)
- HIST. 353. SEMINAR IN ROMAN HISTORY. (3)  
(Jashemski)
- HIST. 355. READINGS IN MEDIEVAL HISTORY. (3)  
(Robertson)
- HIST. 356. SEMINAR IN MEDIEVAL HISTORY. (3)  
(Robertson)
- HIST. 359. READINGS IN MODERN EUROPEAN INTELLECTUAL HISTORY.  
(3)  
(Stromberg)
- HIST. 360. SEMINAR IN MODERN EUROPEAN INTELLECTUAL HISTORY.  
(3)  
(Stromberg)
- HIST. 361. READINGS IN THE HISTORY OF THE RENAISSANCE AND RE-  
FORMATION. (3)  
(Breslow)
- HIST. 363. READINGS IN THE HISTORY OF GREAT BRITAIN AND THE  
BRITISH EMPIRE-COMMONWEALTH. (3)  
(Gordon)
- HIST. 364. SEMINAR IN THE HISTORY OF GREAT BRITAIN AND THE  
BRITISH EMPIRE-COMMONWEALTH. (3)  
(Gordon)
- HIST. 366. SEMINAR IN TUDOR AND STUART ENGLAND. (3)  
(Breslow)
- HIST. 368. SEMINAR IN RUSSIAN HISTORY. (3)  
(Yaney)
- HIST. 369. READINGS IN NINETEENTH CENTURY EUROPE. (3)  
(Bauer)
- HIST. 370. SEMINAR IN NINETEENTH CENTURY EUROPE. (3)  
(Bauer)
- HIST. 371. SEMINAR IN THE HISTORY OF WORLD WAR I. (3)  
(Prange)
- HIST. 372. SEMINAR IN THE HISTORY OF WORLD WAR II. (3)  
(Prange)
- HIST. 381. READINGS IN MIDDLE EASTERN HISTORY. (3)  
(Rivlin)
- HIST. 382. SEMINAR IN MIDDLE EASTERN HISTORY. (3)  
(Rivlin)
- HIST. 387. READINGS IN CHINESE HISTORY. (3)  
(Folsom)

## MATHEMATICS

HIST. 388. SEMINAR IN CHINESE HISTORY. (3)

(Folsom)

HIST. 390. THE TEACHING OF HISTORY IN INSTITUTIONS OF HIGHER LEARNING. (1)

(Staff)

HIST. 399. THESIS RESEARCH. (1-6)

(Staff)

## MATHEMATICS

*Professor and Head:* COHEN.

*Professor and Associate Head:* BRACE.

*Professors:* DOUGLIS, GOLDBERGER, GOOD, HORVATH, HUMMEL, JACKSON, KURODA, J. LEHNER, MARTIN,\* MAYOR, REINHART, RICHESON, STELLMACHER AND WALSH.

*Associate Professors:* AUSLANDER, CORREL, EHRLICH, FREEMAN, GOLDBERG, GREENBERG, HARRIS, KARP, KLEPPNER, G. LEHNER, PEARL, SAGLE, SYSKI AND ZEDEK.

*Assistant Professors:* BUCY, DANIEL, DYER, GARSTENS, GULICK, HELZER, KIRWAN, MALTESE, MCGUINNESS, MIKULSKI, MOUNTJOY, NIETO, OSBORN, ROSELLE, SEDGEWICK, SHEPHERD, STRAUSS, TULLEY, WARNER, WHITLEY AND WILLKE.

*Visiting Assistant Professor:* BEARDON.

*Instructors:* BARI, BERNHARDT, BROWN (P.T.), CURRIER, GARRETT, KILBOURN, KOZAKOFF, LEPSON, MAR, MCCLAY, SORENSON, VANDERSLICE AND ZEMEL.

The Mathematics Department Colloquium meets frequently throughout the academic year for reports on current research by the resident staff, visiting lecturers, and graduate students. In addition, the Institute for Fluid Dynamics and Applied Mathematics Colloquium meets at frequent intervals for reports on research in those fields. All colloquium meetings are open to the public.

The local chapter of Pi Mu Epsilon, national honorary mathematics fraternity, meets regularly for the discussion of mathematical topics of interest to the undergraduates. Its programs are open to the public.

**MATHEMATICS MAJOR:** The program in mathematics leading to the degree of Bachelor of Science in Mathematics offers training in the fundamentals of mathematics in preparation for graduate work or teaching, or for positions in governmental or industrial laboratories.

---

\* Member of the Institute for Fluid Dynamics and Applied Mathematics.

A student intending to major in mathematics must complete the introductory sequence: Math. 19, 20, 21, 22, or the corresponding honors sequence: Math. 19H, 21H, 22H. In addition, the normal requirements for a mathematics major include 23 credit hours of upper division (100-level) work and at least 22 credit hours of supporting courses.

The upper division work in mathematics must normally include Math. 110—Advanced Calculus (4), and one of the algebra courses: Math. 100—Vectors and Matrices (3), Math. 103—Introduction to Abstract Algebra I (3), Math. 104—Introduction to Abstract Algebra II (3). The remaining courses must be selected from at least three of the five groups: I, Algebra, Number Theory and Foundations; II, Analysis; III, Geometry and Topology; IV, Probability and Statistics; V, Numerical Mathematics.

Supporting courses must include Physics 20, 21 (5,5) or Physics 15, 16, 17 (4, 4, 4), and an additional twelve credit hours of which at least six must be in one department at the 100 level.

The foreign language requirement should be satisfied by either German, French, or Russian.

Each student's program must be approved by his Mathematics Department Adviser.

A student must maintain a "C" average in all mathematics courses to continue as a mathematics major. No grade below "C" can be used to meet the mathematics course requirements listed above, and a student must repeat any upper division mathematics course in which he has received a grade below "C," unless he has permission from his adviser to drop this course from his major program.

**HONORS IN MATHEMATICS:** The honors program is designed for students showing exceptional ability and interest in mathematics. Its aim is to give a student the best possible mathematical education. Participants are selected by the Honors Committee of the Department of Mathematics on the basis of recommendations from high school teachers and members of the faculty.

Wherever possible, honors students are placed in special mathematics courses, or in special sections of regular courses. Independent work is encouraged and can be done in place of formal course work. A final written and oral comprehensive examination in mathematics is given at the end of the program.

**INTRODUCTORY MATHEMATICS COURSES:** Beginning students normally enroll in one of the courses Math. 3, 10, 18, or 19. A student may enroll in Math. 10, 18, or 19 if he has the necessary high school mathematics and a suitable score on the mathematics section of the general classification test. Students whose curriculum calls for Math. 10 or Math. 18 and who do not have the necessary prerequisites should enroll in Math. 1.

## MATHEMATICS

In general, students should enroll in only one of the course sequences Math. 10, 11, 14, 15 or Math. 18, 19, 20, 21, 22. In case this rule is not followed, proper assignment of credit will be made upon application to the Department of Mathematics.

### MATH. 1. REVIEW OF HIGH SCHOOL ALGEBRA. (0)

Recommended for students who fail the qualifying examination for Math. 10 and 18. Special fee of \$45. (Sorensen)

### MATH. 3. FUNDAMENTALS OF MATHEMATICS. (4)

This course, open to all students, is designed to provide an introduction to mathematical thinking and to develop an appreciation of the role of mathematics in human culture. (Douglass)

### MATH. 10, 11. INTRODUCTION TO MATHEMATICS. (3, 3)

Prerequisite,  $2\frac{1}{2}$  years of college preparatory mathematics and satisfactory performance on the ACT mathematics test, or Math. 1. Open to students not majoring in mathematics or the physical or engineering sciences. Logic, sets, counting, probability; sequences, sums; elementary algebraic and transcendental functions and their geometric representation; systems of linear equations, vectors, matrices. (Good)

### MATH. 14, 15. ELEMENTARY CALCULUS. (3, 3)

Prerequisite, Math. 11 or equivalent. Open to students not majoring in mathematics or the physical or engineering sciences. Basic ideas of differential and integral calculus; elementary techniques and applications. (Correl)

### MATH. 18. INTRODUCTORY ANALYSIS. (3) (2 lectures, 2 drill periods per week.)

Prerequisite,  $2\frac{1}{2}$  years of college preparatory mathematics and an appropriate score on the ACT mathematics test, or Math. 1. An introductory course for students not qualified to start Math. 19. Real numbers, functions, coordinate systems. Trigonometric functions. Plane analytic geometry. (Richeson)

### MATH. 19. ELEMENTARY ANALYSIS. (4) (3 lectures, 2 drill periods per week.)

Prerequisite,  $3\frac{1}{2}$  years of college preparatory mathematics and an appropriate score on the ACT mathematics test, or Math. 18. Vectors and analytic geometry in three dimensions. Linear transformations and applications to geometry. Review of real numbers, coordinate systems, trigonometric functions, determinants. (Jackson)

### MATH. 19H. ELEMENTARY ANALYSIS (HONORS). (5)

See Math. 22 H. (Ehrlich)

### MATH. 20. CALCULUS I. (4) (3 lectures, 2 drill periods per week.)

Prerequisite, Math. 19 or equivalent. Functions, limits, continuity. Integration, differentiation and applications. Basic properties of the elementary functions. (Jackson)

**MATH. 21. CALCULUS II. (4)** (3 lectures, 2 drill periods per week.)

Prerequisite, Math. 20 or equivalent. Methods of integration. Arc length, velocity, and acceleration. Tangents and normals to space curves. Improper integrals, sequences, and infinite series. (Jackson)

**MATH. 21H. CALCULUS (HONORS). (5)**

See Math. 22 H.

**MATH. 22. CALCULUS III. (4)** (3 lectures, 2 drill periods per week.)

Prerequisite, Math. 21 or equivalent. Basic concepts of linear algebra, matrices, and determinants. Calculus of functions of vectors. Implicit function theorem. Surface integrals. Classical theorems of Green, Gauss, and Stokes. (Jackson)

**MATH. 22H. CALCULUS (HONORS). (5)**

The three honors sections, Math. 19 H, 21 H, and 22 H are open to selected students upon approval by the mathematics department. A student who completes these three semester courses will have a knowledge of the material covered in the regular sections of Math. 19, 20, 21 and 22. Senior staff members of the mathematics department will teach these sections. Students may transfer out of the honors sections at any time. A mathematics department adviser will help the student who has completed part of the honors course determine the proper regular course to enter. (Ehrlich)

**MATH. 30. ELEMENTS OF MATHEMATICS. (4)**

Prerequisite, one year of college preparatory algebra. Required for majors in elementary education, and open only to students in this field. Topics from algebra and number theory, designed to provide insight into arithmetic: inductive proof, the natural number system based on the Peano axioms; mathematical systems, groups, fields; the system of integers; the system of rational numbers; congruence, divisibility; systems of numeration. (Garstens)

**MATH. 31. ELEMENTS OF GEOMETRY. (4)**

Prerequisite, Math. 30 or equivalent. Structure of mathematics systems, algebra of sets, geometrical structures, logic, measurement, congruence, similarity, graphs in the plane, geometry on the sphere. (Garstens)

**MATH. 66 (64). DIFFERENTIAL EQUATIONS FOR SCIENTISTS AND ENGINEERS. (3)**

Prerequisite, Math. 21 or equivalent. The field of directions and graphic solutions of first order differential equations. The simplest methods of numerical solution. Systems of differential equations. Introduction to Fourier series, and applications. (Stellmacher)

**ALGEBRA AND NUMBER THEORY**

*For Advanced Undergraduates and Graduates*

**MATH. 100. VECTORS AND MATRICES. (3)**

Prerequisite, Math. 21 or Math. 15. Algebra of vector spaces and matrices. Recommended for students interested in the applications of mathematics. (Pearl)

## MATHEMATICS

### MATH. 103. INTRODUCTION TO ABSTRACT ALGEBRA. (3)

Prerequisite, Math. 22 or equivalent. Integers; groups, rings, integral domains, fields. (Ehrlich)

### MATH. 104. INTRODUCTION TO LINEAR ALGEBRA. (3)

Prerequisite, Math. 103 or consent of instructor. An abstract treatment of finite dimensional vector spaces. Linear transformations and their invariants. (Ehrlich)

### MATH. 106. INTRODUCTION TO NUMBER THEORY. (3)

Prerequisite, Math. 22. Integers, divisibility, Euclid's algorithm, diophantine equations, prime numbers, congruences, reciprocity law of quadratic residues, quadratic fields, binary quadratic forms. (Kuroda)

## *For Graduates*

### MATH. 200. ABSTRACT ALGEBRA I. (3)

Prerequisite, Math. 104 or equivalent. Elementary properties and examples of groups and rings, homomorphism theorems; integral domains, elementary factorization theory. Groups with operators; isomorphism theorems, normal series, Jordan-Holder Theorem, direct products, Krull-Schmidt Theorem. (Goldhaber)

### MATH. 201. ABSTRACT ALGEBRA II. (3)

Prerequisite, Math. 200 or consent of instructor. Field theory, Galois theory. Commutative ideal theory. Multilinear algebra. (Goldhaber)

### MATH. 202. LINEAR ALGEBRA. (3)

Prerequisite, Math. 201 or consent of instructor. Linear manifolds, the lattice sub-spaces, projectives, dualities, the ring of endomorphisms, the full linear group and its subgroups. (Pearl)

### MATH. 203. GALOIS THEORY. (3)

Prerequisite, Math. 201 or consent of instructor. Field extensions, automorphisms of a field, the Galois group of a polynomial equation, solvability by radicals, recent developments in Galois theory. (Kuroda)

### MATH. 204, 205. TOPOLOGICAL GROUPS. (3, 3)

Prerequisite, consent of instructor. An introductory course in abstract groups, topological spaces, and the study of collections of elements enjoying both these properties. The concept of a uniform space will be introduced and studied. The representation problem will be considered together with the subject of Lie groups. (Pearl)

### MATH. 206. NUMBER THEORY. (3)

Prerequisite, consent of instructor. Foundations, linear and higher congruences, law of reciprocity, quadratic forms, sieve methods, elements of additive number theory and density, distribution of prime numbers and L-functions, discussion of unsolved problems. (Kuroda)

**MATH. 208. RING THEORY. (3)**

Prerequisite, Math. 201 or consent of instructor. According to the needs of the class, emphasis will be placed on one or more of the following: ideal theory, structure theory of rings with or without minimum condition, division rings, algebras, non-associative rings. (Goldhaber)

**MATH. 209. GROUP THEORY. (3)**

Prerequisite, Math. 201 or consent of instructor. According to the needs of the class, emphasis will be placed on one or more of the following aspects of discrete group theory: finite groups, abelian groups, free groups, solvable or nilpotent groups, groups with operators, groups with local properties, groups with clan conditions, extensions. (Rosenfeld)

**MATH. 271. SELECTED TOPICS IN ALGEBRA. (3)**

(Arranged.) Prerequisite, consent of instructor. (Staff)

**ANALYSIS**

*For Advanced Undergraduates and Graduates*

**MATH. 110. ADVANCED CALCULUS. (4)**

Prerequisite, Math. 22. A rigorous development of many topics from classical analysis such as the Stieltjes integral, surface integrals, sequences and series of functions, introduction to the Dirichlet integral. (A special section of Math. 110 for honors students will be provided.) (Strauss)

**MATH. 111. ADVANCED CALCULUS. (4)**

Prerequisite, Math. 110 or equivalent. Calculus of functions of several variables. (Harris)

**MATH. 112. INFINITE PROCESSES. (3)**

Prerequisite, Math. 21 or equivalent. Construction of the real numbers from the rational numbers, sequences of numbers, series of positive and arbitrary numbers, infinite products, conditional and absolute convergence, sequences and series of functions, uniform convergence, integration and differentiation of series, power series, and analytic functions. Fourier series, elements of the theory of divergent series, extension of the theory to complex numbers and functions. (Kirwan)

**MATH. 113. INTRODUCTION TO COMPLEX VARIABLES. (4)**

Prerequisite, Math. 110. The algebra of complex numbers, analytic functions, mapping properties of the elementary functions. Cauchy's theorem and the Cauchy integral formula. Taylor and Laurent series. Residues. (Hummel)  
(Credit will be given for only one of the courses Math. 113 and Math. 163.)

**MATH. 114. DIFFERENTIAL EQUATIONS. (3)**

Prerequisite, Math. 110. A general introduction to the theory of differential equations. Constructive methods of solution leading to existence theorems and uniqueness theorems. Other topics such as systems of linear equations, the behavior of solutions in the large, the behavior of solutions near singularities, periodic solutions, stability, and Sturm-Liouville Problems. (Auslander)

## MATHEMATICS

### MATH. 117. INTRODUCTION TO FOURIER ANALYSIS. (3)

Prerequisite, Math. 113. Fourier series, Fourier and Laplace transforms.  
(Maltese)

### MATH. 118. INTRODUCTION TO REAL VARIABLES. (3)

Prerequisite, Math. 110. The Lebesgue integral. Fubini's theorem. Convergence theorems. The  $L^p$  spaces.  
(Freeman)

### MATH. 119. SEVERAL REAL VARIABLES. (3)

A brief review of scalar and vector valued functions of several real variables (as done in Math. 22). Implicit function theorem, change of variable theorem for multiple integrals, a detailed study of surfaces and surface integrals in  $n$ -dimensional Euclidean space, including Integration by parts. Applications to Partial Differential Equations and Potential Theory.

### MATH. 162. ANALYSIS FOR SCIENTISTS AND ENGINEERS I. (3)

Prerequisite, Math. 21 or consent of instructor. Calculus of functions of several real variables; limits, continuity, partial differentiation, multiple integrals, line and surface integrals, vector-valued functions, theorems of Green, Gauss and Stokes. Physical applications. (This course cannot be counted toward a major in mathematics. Credit will be given for only one of the courses Math. 22 and Math. 162.)  
(Sedgewick)

### MATH. 163. ANALYSIS FOR SCIENTISTS AND ENGINEERS II. (3)

Prerequisite, Math. 162 or 22 or consent of instructor. The complex field. Infinite processes for real and complex numbers. Calculus of complex functions. Analytic functions and analytic continuation. Theory of residues and application to evaluation of integrals. Conformal mapping. (This course cannot be counted toward a major in mathematics. Credit will be given for only one of the courses Math. 113 and Math. 163.)  
(Sedgewick)

### MATH. 164. ANALYSIS FOR SCIENTISTS AND ENGINEERS III. (3)

Prerequisites, Math. 64 and Math. 163, or consent of instructor. Fourier and Laplace transforms. Evaluation of the complex inversion integral by the theory of residues. Applications to systems of ordinary and partial differential equations.  
(Stellmacher)

### *For Graduates*

### MATH. 215, 216. ADVANCED DIFFERENTIAL EQUATIONS. (3, 3)

Prerequisites, Math. 104, 286. Existence and uniqueness theorems. Linear systems. Autonomous systems in the plane. Nonlinear systems. Asymptotic behavior of solutions.  
(Auslander)

### MATH. 218, 219. FUNCTIONAL ANALYSIS. (3, 3)

Prerequisites, Math. 286, 287. Normed linear spaces including Banach and Hilbert spaces, linear operators and their spectral analysis with applications to differential and integral equations.  
(Goldberg)

### MATH. 272. SELECTED TOPICS IN ANALYSIS. (3)

(Arranged.) Prerequisite, consent of instructor. (Staff)

### MATH. 278. ADVANCED TOPICS IN COMPLEX ANALYSIS. (3)

(Arranged.) Prerequisite, consent of instructor. (Staff)

**MATH. 280, 281. LINEAR SPACES. (3, 3)**

Prerequisite, Math. 218. Linear topological spaces, locally convex spaces, duality theory, distributions. (Brace)

**MATH. 286. REAL ANALYSIS I. (3)**

Prerequisite, Math. 110. Sets. Metric spaces. Lebesgue measure and integration. Differentiation. Introduction to Banach and Hilbert spaces. (Douglis)

**MATH. 287. COMPLEX ANALYSIS I. (3)**

Prerequisite, Math. 110. Linear transformations, analytic functions, conformal mappings, Cauchy's theorem and applications, power series, partial fractions and factorization, elementary Riemann surfaces, Riemann mapping theorem. (J. Lehner)

**MATH. 288. COMPLEX ANALYSIS II. (3)**

Prerequisites, Math. 286, 287. Topics in conformal mappings, normal families, Picard's theorem, classes of univalent functions, extremal properties, variational methods, elliptic functions, Riemann surfaces. (Zedek)

**MATH. 289. REAL ANALYSIS II. (3)**

Prerequisites, Math. 286, 287. General topology, measure theory.  $L^p$  spaces, Fourier transforms, locally compact spaces. (Douglass)

**GEOMETRY AND TOPOLOGY**

*For Advanced Undergraduates and Graduates*

**MATH. 120. INTRODUCTION TO GEOMETRY I. (3)**

Prerequisite, Math. 22 or equivalent. Axiomatic development of plane geometries, Euclidean and non-Euclidean. Groups of isometries and similarities. (Reinhart)

**MATH. 121. INTRODUCTION TO GEOMETRY II. (3)**

Prerequisite, Math. 120. Non-Euclidean transformation groups, the Erlangen program, projective planes, cubics and quartics. (Reinhart)

**MATH. 122. INTRODUCTION TO POINT SET TOPOLOGY. (3)**

Prerequisite, Math. 110 or 146, or equivalent. Connectedness, compactness, transformations, homeomorphisms; application of these concepts to various spaces, with particular attention to the Euclidean plane. (Kleppner)

**MATH. 123. INTRODUCTION TO ALGEBRAIC TOPOLOGY. (3)**

Prerequisite, Math. 122 and 103, or equivalent. Chains, cycles, homology group for surfaces, the fundamental group. (G. Lehner)

**MATH. 124. INTRODUCTION TO PROJECTIVE GEOMETRY. (3)**

Prerequisite, Math. 22 or equivalent. Recommended for students in the College of Education. Elementary projective geometry, combining synthetic and algebraic approaches, projective transformations, harmonic division, cross ratio, projective coordinates, properties of conics. (Correl)

**MATH. 126. INTRODUCTION TO DIFFERENTIAL GEOMETRY. (3)**

Prerequisite, Math. 22 or equivalent. The differential geometry of curves and surfaces, curvature and torsion, moving frames, the fundamental differential forms, intrinsic geometry of a surface. (Jackson)

## MATHEMATICS

### MATH. 128. EUCLIDEAN GEOMETRY. (3)

Prerequisite, Math. 22 or equivalent. Recommended for students in the College of Education. Axiomatic method, models, properties of axioms; proofs of some basic theorems from the axioms; modern geometry of the triangle, circle, and sphere. (Correl)

#### *For Graduates*

### MATH. 220. DIFFERENTIAL GEOMETRY OF CURVES AND SURFACES. (3)

Prerequisite, Math. 110 or equivalent. Classical theory of curves and surfaces, geometry in the large, the Gauss-Bonnet Theorem, surfaces of constant curvature. (Jackson)

### MATH. 221. DIFFERENTIABLE MANIFOLDS. (3)

Prerequisite, consent of instructor. Differentiable manifolds, embeddings in Euclidean space, vector and tensor bundles, vector fields, differentiable fields, Riemann matrices. (Reinhart)

### MATH. 222. DIFFERENTIAL GEOMETRY. (3)

Prerequisite, Math. 220 or 221. Connections, curvature, torsion; symplectic, contact, and complex structures. (Reinhart)

### MATH. 223, 224. ALGEBRAIC TOPOLOGY. (3, 3)

Prerequisites, Math. 100 and 123, or consent of instructor. Homology, cohomology, and homotopy theory of complexes and spaces. (G. Lehner)

### MATH. 225, 226. SET THEORETIC TOPOLOGY. (3, 3)

Prerequisite, concurrent enrollment in Math. 286, or equivalent. Foundations of mathematics based on a set of axioms, metric spaces, convergence and connectivity properties of point sets, continua, and continuous curves; the topology of the plane. (Correl)

### MATH. 227, 228. ALGEBRAIC GEOMETRY. (3, 3)

Prerequisite, consent of instructor. Prime and primary ideals in Noetherian rings, Hilbert Nullstellensatz, places and valuations, fields of definition. Chow points, bi-rational correspondences, Abelian varieties, Picard varieties, algebraic groups. (Mountjoy)

### MATH. 229. DIFFERENTIAL TOPOLOGY. (3)

Prerequisite, Math. 221. Characteristic classes, cobordism, differential structures on cells and spheres. (Reinhart)

### MATH. 273. SELECTED TOPICS IN GEOMETRY AND TOPOLOGY. (3)

(Arranged.) Prerequisite, consent of instructor. (Staff)

## PROBABILITY AND STATISTICS

#### *For Advanced Undergraduates and Graduates*

### MATH. 130. INTRODUCTION TO PROBABILITY THEORY I. (3)

Prerequisite, Math. 110, or equivalent. Sample space, events, probability and its basic properties. Independence and conditioning, random variables, distribution functions (continuous and discrete); typical distributions, expectations, moments, generating functions; transformations of random variables, limit theorems. (Syski)

**MATH. 131. INTRODUCTION TO PROBABILITY THEORY II. (3)**

Prerequisite, Math. 130. Elementary stochastic processes. Renewal process, random walk, discrete Markov chains, birth processes, birth and death processes, stationary processes. (Daniel)

**MATH. 132. INTRODUCTION TO STATISTICS. (3)**

(3 lectures and 1 hour of laboratory a week.)

Prerequisite, Math. 130. Sampling distributions, elements of point and set estimation, maximum likelihood principle, testing statistical hypotheses, standard tests, Neyman-Pearson lemma and problems of optimality of tests, linear hypotheses, sequential methods. (Mikulski)

**MATH. 133. APPLIED PROBABILITY AND STATISTICS I. (3)**

Prerequisite, Math. 15 or 21. Intended for students with major other than mathematics. Probability concepts in finite sample spaces, generalizations to continuous case (intuitive approach), random variables and distribution functions, standard distributions, expectations, moments and generating functions, limit theorems. (Willke)

**MATH. 134. APPLIED PROBABILITY AND STATISTICS II. (3)**

Prerequisite, Math. 133. Sampling distributions, estimation methods, standard procedures in testing statistical hypotheses, testing location and scale parameters, tests of independence and goodness of fit, elements of variance and regression analysis. (Willke)

*For Graduates*

**MATH. 230, 231. PROBABILITY THEORY. (3, 3)**

Prerequisites, Math. 111 and 130, or consent of instructor. Foundations of probability theory. Fields of events, probability space and probability measure. Random variables and convergence of random variables. Induced probability spaces. Expectations and moments. Distribution functions and their transforms. Consistency theorem. Laws of large numbers and central limit problem. Conditioning. Measurability and separability of stochastic processes. Stationary processes, harmonic analysis, Markov processes, Kolmogorov equations, diffusion theory. Martingales. (Syski)

**MATH. 232. APPLIED STOCHASTIC PROCESSES. (3)**

Prerequisites, Math. 111 and 130, or consent of instructor. Basic concepts of stochastic processes, stationary processes. Markov chains and processes (discrete and continuous parameter). Birth and death processes. Applications from theories of queueing, storage, inventory, noise, epidemics and others. This course is recommended for graduates from Physics, Engineering, Biology and Social Sciences. (Bucy)

**MATH. 235, 236. TESTING STATISTICAL HYPOTHESES. (4, 4)**

Prerequisites, Math. 130 and 132. (Recommended to be concurrent with Math. 230, 231.) 3 hours lecture, 2 hours laboratory per week. Statistics decision problems. Uniformly most powerful tests. Exponential families of distributions, concepts of similarity and tests with Neyman-structure. Unbiased tests. Invariance and almost invariance. Elements of non-parametric inference. Linear hypotheses. Large sample methods. (Mikulski)

## MATHEMATICS

### MATH. 275. SELECTED TOPICS IN PROBABILITY. (3)

(Arranged.) Prerequisite, consent of instructor.

(Staff)

### MATH. 276. SELECTED TOPICS IN STATISTICS. (3)

(Arranged.) Prerequisite, consent of instructor.

(Staff)

## FOUNDATIONS OF MATHEMATICS

### *For Advanced Undergraduates and Graduates*

### MATH. 146. FUNDAMENTAL CONCEPTS OF MATHEMATICS. (3)

Prerequisite, Math. 22 or consent of instructor. Sets, relations, mappings. Construction of the real number system starting with Peano postulates; algebraic structures associated with the construction; Archimedean order, sequential completeness and equivalent properties of ordered fields. Finite and infinite sets, denumerable and non-denumerable sets.

(Cohen)

### MATH. 147. SET THEORY. (3)

Prerequisite, Math. 22 or consent of instructor. Set Algebra, cardinal arithmetic, axiom of choice, Zorn's lemma, well-ordering principle, transfinite induction, ordinal arithmetic, continuum hypothesis.

(Karp)

### MATH. 148. INTRODUCTION TO MATHEMATICAL LOGIC. (3)

Prerequisite, Math. 146 or 147 or 103. Propositional calculus, predicate logic, axiomatic set theory, paradoxes. (Not open to students with credit for Math. 144.)

(Karp)

### *For Graduates*

### MATH. 244. MATHEMATICAL LOGIC. (3)

Prerequisite, Math. 148. Completeness of first-order predicate logic and applications, recursive functions, Godel's incompleteness theorem.

(Karp)

### MATH. 277. SELECTED TOPICS IN MATHEMATICAL LOGIC. (3)

(Arranged.) Prerequisite, consent of instructor.

(Staff)

## MATHEMATICAL METHODS

### *For Advanced Undergraduates and Graduates*

### MATH. 158. GAMES AND LINEAR RELATIONS. (3)

Prerequisite, Math. 22; Math 100 recommended. Theory of games, minimax theorem, theory of linear programming, simplex method, systems of linear inequalities and the nature of their solutions, geometrical interpretations.

(Pearl)

### MATH. 212. SPECIAL FUNCTIONS. (3)

Prerequisite, Math. 287 or consent of instructor. Gamma-function, Riemann zeta-function, hypergeometric functions, confluent hypergeometric functions and Bessel functions.

(Stellmacher)

**MATH. 252. VARIATIONAL METHODS. (3)**

Prerequisites, Math. 257 and Math. 258. The Euler-Lagrange equation, minimal principles in mathematical physics, estimation of capacity, torsional rigidity and other physical quantities; symmetrization, isoperimetric inequalities, estimation of eigenvalues, the minimax principle. (Trytten)

**MATH. 257. OPERATORS ON NORMED SPACES. (3)**

Prerequisite, Math. 111. An introduction to linear analysis, in particular to those concepts and methods important in modern applied mathematics. Among the topics to be covered are linear spaces, norms and inner products, linear operators, eigenvalues, basic inequalities. (Nieto)

**MATH. 258. INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS. (3)**

Prerequisite, Math. 111. General introduction to the field of partial differential equations. Among the topics to be discussed are typical boundary and initial value problems of mathematical physics and an indication of the main methods of solution, relations to difference equations and integral equations. (Nieto)

**MATH. 259. INTRODUCTION TO CONTINUUM MECHANICS. (3)**

Prerequisites, Math. 100 and Math. 258 or consent of instructor. Solid and fluid continua, general analysis of stress and strain, equilibrium of elastic bodies, equation of motion for fluid bodies, stress-strain relations, equations of perfect fluids and formulation of viscous flow problems. (Bragg)

**MATH. 261, 262. FLUID DYNAMICS. (3, 3)**

Prerequisite, Math. 259 or consent of instructor. A mathematical formulation and treatment of problems arising in the theory of incompressible, compressible and viscous fluids. (Mackie)

**MATH. 263. LINEAR ELASTICITY. (3)**

Prerequisite, Math. 259. Linear elastic behavior of solid continuous media. Topics covered include torsion and flexure of beams, plane strain and plane stress, vibration and buckling problems, variational principles. Emphasis is placed on formulation and technique rather than on specific examples. (Bragg)

**MATH. 264. NON-LINEAR ELASTICITY. (3)**

Prerequisite, Math. 259. Fundamentals of non-linear elasticity, finite deformations, rubber elasticity, small deformations superimposed on finite deformations. (Bragg)

**MATH. 265. PARTIAL DIFFERENTIAL EQUATIONS. (3)**

Prerequisite, Math. 258. Two variables, Cauchy's problem, characteristics, Riemann's method, properties of the Riemann function, quasi-linear equations and canonical hyperbolic systems, wave equation in  $n$ -dimensions, method of Hadamard and Riesz, Euler-Poisson equation and the singular problems, Huyghen's principle. (Stellmacher)

**MATH. 266. ELLIPTIC DIFFERENTIAL EQUATIONS. (3)**

Prerequisite, Math. 258. The equations of Laplace and Poisson, flux, the theorems of Gauss and Green, potentials of volume and surface distributions, harmonic functions, Green's function and the problems of Dirichlet and Neu-

## MATHEMATICS

mann; linear elliptic equations with variable coefficients, in particular the equations of Stokes and Beltrami; fundamental solutions, the principle of the maximum, and boundary value problems; introduction to the theory of non-linear equations. (Stellmacher)

### MATH. 274. SELECTED TOPICS IN APPLIED MATHEMATICS. (3)

(Arranged.) Prerequisite, consent of instructor.

(Staff)

## NUMERICAL MATHEMATICS

### *For Advanced Undergraduates and Graduates*

### MATH. 170. INTRODUCTION TO NUMERICAL ANALYSIS. (4)

(3 lectures and 2 laboratory periods per week.)

Prerequisite, Math. 21 or Math. 15. Introduction to numerical methods, errors, interpolations, differences, numerical differentiation and integration, iterative solution of equations, least squares, elements of numerical approximation.

(Rheinboldt)

### MATH. 171. NUMERICAL METHODS IN LINEAR ALGEBRA. (4)

(3 lectures and 2 laboratory periods per week.)

Prerequisites, Math. 100 or 104, Math. 110, Math. 170. Numerical solution of linear equations, direction methods, iterative methods, eigenvalue problems and their numerical solution, errors connected with numerical work in linear algebra.

(Rheinboldt)

### MATH. 172. NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS. (4)

(3 lectures and 2 laboratory periods per week.) Prerequisites, Math. 22 or 162, and Math. 171. The methods of Euler, Runge, Kutta, and other single-step methods, multistep methods, discretization errors, stability problems.

(Rheinboldt)

### MATH. 173. NUMERICAL METHODS FOR SCIENTISTS AND ENGINEERS. (4)

(3 lectures and 2 laboratory periods per week.) Prerequisites, Math. 22 or 162, and Math. 64. Interpolation, numerical differentiation and integration, numerical solution of polynomial and transcendental equations, least squares, systems of linear equations, numerical solution of ordinary differential equations, errors in numerical calculations.

(Rheinboldt)

### *For Graduates*

### MATH. 255, 256. ADVANCED NUMERICAL METHODS IN DIFFERENTIAL EQUATIONS. (3, 3)

Prerequisites, Math. 257 and Math. 258. Approximation methods for boundary value, initial value and eigenvalue problems in both ordinary and partial differential equations, including finite differences and methods involving approximating functions.

(Rheinboldt)

### MATH. 267, 268. MODERN NUMERICAL MATHEMATICS. (3, 3)

Prerequisites, Math. 170 and Math. 257. Review of classical numerical analysis, matrix computations in particular numerical evaluation of eigenvalues, iterative

techniques from a viewpoint of linear analysis; introduction to numerical approximations; error analysis in numerical computation. The course will involve laboratory work in the Computer Science Center. (Rheinboldt)

## MATH. 269. ADVANCED MATHEMATICAL PROGRAMMING. (3)

Prerequisites, Math. 158 and Math. 257. Linear inequalities and related systems and their applications to linear programming, convex functions and generalized programming problems, topics in non-linear and dynamic programming. (Rheinboldt)

## COURSES FOR TEACHERS OF MATHEMATICS AND SCIENCE

### MATH. 181. INTRODUCTION TO NUMBER THEORY. (3)

Prerequisite, one year of college mathematics or consent of instructor. Designed primarily for those enrolled in programs with emphasis in the teaching of mathematics and science. Not open to students seeking a major directly in the physical sciences, since the course content is usually covered elsewhere in their curriculum. Axiomatic developments of the real numbers. Elementary number theory.

### MATH. 182. INTRODUCTION TO ALGEBRA. (3)

Prerequisite, one year of college mathematics or consent of instructor. Designed primarily for those enrolled in programs with emphasis in the teaching of mathematics and science. Not open to students seeking a major directly in the physical sciences, since the course content is usually covered elsewhere in their curriculum. Modern ideas in algebra and topics in the theory of equations.

### MATH. 183. INTRODUCTION TO GEOMETRY. (3)

Prerequisite, one year of college mathematics or consent of instructor. Designed primarily for those enrolled in programs with emphasis in the teaching of mathematics and science. Not open to students seeking a major directly in the physical sciences, since the course content is usually covered elsewhere in their curriculum. A study of the axioms for Euclidean and non-Euclidean geometry.

### MATH. 184. INTRODUCTION TO ANALYSIS. (3)

Prerequisite, one year of college mathematics or consent of instructor. Designed primarily for those enrolled in programs with emphasis in the teaching of mathematics and science. Not open to students seeking a major directly in the physical sciences, since the course content is usually covered elsewhere in their curriculum. A study of the limit concept and the calculus. (Previous knowledge of calculus is not required.)

### MATH. 185. SELECTED TOPICS FOR TEACHERS OF MATHEMATICS. (1-3)

Prerequisite, one year of college mathematics or consent of instructor.

### MATH. 189. NATIONAL SCIENCE FOUNDATION SUMMER INSTITUTE FOR TEACHERS OF SCIENCE AND MATHEMATICS. SEMINAR. (1-3)

Lectures and discussions to deepen the student's appreciation of mathematics as a logical discipline and as a medium of expression. Special emphasis on topics relevant to current mathematical curriculum studies and revisions.

## MICROBIOLOGY

### SEMINARS, SELECTED TOPICS, RESEARCH

#### *For Advanced Undergraduates and Graduates*

#### MATH. 190. HONORS SEMINAR. (2)

Prerequisite, permission of the departmental Honors Committee. Reports by students on mathematical literature; solution of various problems. (Karp)

#### MATH. 191. SELECTED TOPICS IN MATHEMATICS. (Credit according to work done)

Prerequisite, permission of the instructor. Topics of special interest to advanced undergraduate students will be offered occasionally under the general guidance of the departmental Committee on Undergraduate Studies. Honors students register for reading courses under this number. (Staff)

#### *For Graduates*

#### MATH. 298. PROSEMINAR IN RESEARCH. (1)

Prerequisite, one semester of graduate work in mathematics. A seminar devoted to the foundations of mathematics, including mathematical logic, axiom systems, and set theory. (Auslander)

#### MATH. 399. RESEARCH.

(Arranged.)

(Staff)

## MICROBIOLOGY

*Professor and Head:* FABER.

*Professor:* HANSEN, PELCZAR, DOETSCH AND LAFFER.

*Associate Professor:* HETRICK.

*Assistant Professors:* MACQUILLAN AND ROBERSON.

*Lecturer:* STADTMAN.

The Department of Microbiology has as its primary aim providing the student with thorough and rigorous training in microbiology. This entails knowledge of the basic concepts of bacterial cytology, physiology, taxonomy, and genetics, as well as an understanding of the biology of infectious disease, immunology, general virology, and various applications of microbiological principles to public health and industrial arts. In addition, the Department pursues a broad and vigorous program of basic research, and encourages original thought and investigation in the above mentioned areas.

The Department also provides desirable courses for students majoring in allied departments who wish to obtain vital, supplementary information. Every effort has been made to present the subject matter of Microbiology as a basic core of material that is pertinent to all biological sciences.

**MICROBIOLOGY CURRICULUM:** The field of microbiology is too vast in scope to permit specialization during undergraduate study. Accordingly, the curriculum outlined below, which leads to a B.S. degree, includes the basic courses in microbiology and allied fields.

A student planning a major in microbiology should consult his adviser during the first year. The supporting courses should be chosen only from the biological or physical sciences.

No course with a grade less than "C" may be used to satisfy major requirements.

The Department has an Honors Program and information concerning this program may be obtained from the Department.

Courses required in major, and supporting courses: Microb. 1—General Microbiology (4), Microb. 60—Microbiological Literature (1), Microb. 81—Applied Microbiology (4), Microb. 101—Pathogenic Microbiology (4), Microb. 103—Serology (4), Microb. 111—General Virology (4), Microb. 151—Microbial Physiology (4), Microb. 160—Systematic Bacteriology (2); Chem. 1, 3—General Chemistry (4, 4), Chem. 31, 33—Elements of Organic Chemistry (3, 3), Chem. 19—Elements of Quantitative Analysis (4) or Math. 14, 15—Elementary Calculus (3, 3), Chem. 161, 163—Biochemistry (2, 2), Math. 10, 11—Introduction to Mathematics (3, 3), Phys. 10, 11—Fundamentals of Physics (4, 4).

#### **MICROB. 1. GENERAL MICROBIOLOGY. (4)**

First and second semesters. Summer session. Two lectures and two two-hour laboratory periods a week. Laboratory fee, \$15.00. The physiology, culture and differentiation of microorganisms. Fundamental principles of microbiology in relation to man and his environment. (Pelczar)

#### **MICROB. 60. MICROBIOLOGICAL LITERATURE. (1)**

Second semester. One lecture period a week. Prerequisite, a major in microbiology. Introduction to periodical literature, methods, interpretation and presentation of reports. (Doetsch)

#### **MICROB. 81. APPLIED MICROBIOLOGY. (4)**

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Microb. 1. Laboratory fee, \$15.00. The application of microorganisms and microbiological principles to milk, dairy products, and foods, industrial processes; soil; water and sanitation operations. (Roberson)

### *For Advanced Undergraduates and Graduates*

#### **MICROB. 101. PATHOGENIC MICROBIOLOGY. (4)**

First semester. Two lecture and two two-hour laboratory periods a week. Prerequisite, Microb. 1. Laboratory fee, \$15.00. The role of microorganisms in the diseases of man and animals with emphasis upon the differentiation and culture of microorganisms, types of disease, modes of disease transmission, prophylactic, therapeutic and epidemiological aspects. (Faber)

## MICROBIOLOGY

### MICROB. 103. SEROLOGY. (4)

First semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Microb. 101. Laboratory fee, \$15.00. Infection and resistance; principles and types of immunity; hypersensitiveness. Fundamental techniques of major diagnostic immunological reactions and their application.

(Roberson)

### MICROB. 104. HISTORY OF MICROBIOLOGY. (1)

First semester. One lecture period a week. Prerequisite, a major or minor in microbiology. History and integration of the fundamental discoveries of the science. The modern aspects of cytology, taxonomy, fermentation, and immunity in relation to early theories.

(Doetsch)

### MICROB. 108. EPIDEMIOLOGY AND PUBLIC HEALTH. (2)

Second semester. Two lecture periods a week. Prerequisite, Microb. 1. History, characteristic features, and epidemiology of the important communicable diseases, public health administration and responsibilities; vital statistics.

(Faber)

### MICROB. 111. GENERAL VIROLOGY. (4)

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Microb. 101 or equivalent. Laboratory fee, \$15.00. Basic concepts regarding the nature of viruses and their properties, together with techniques for their characterization and identification.

(Hetrick)

### MICROB. 121. ADVANCED METHODS. (4)

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, consent of instructor. Laboratory fee, \$15.00. The application of quantitative techniques for measurement of enzyme reactions, mutations, fermentation, analyses, and other physiological processes of microorganisms.

(Hansen, Pelczar)

### MICROB. 135. APPLIED MICROBIOLOGY. (4)

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisites, Microb. 1, Chem. 31, and Chem. 33. Laboratory fee, \$15.00. Introduction to the chemical activities of microorganisms and their industrial application.

(MacQuillan)

### MICROB. 151. MICROBIAL PHYSIOLOGY. (4)

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisites, 8 credits in microbiology and Chem. 31, 33, or equivalent. Laboratory fee, \$15.00. Aspects of the growth, death, and energy transactions of microorganisms are considered, as well as the effects of the physical and chemical environment on them.

(MacQuillan)

### MICROB. 160. SYSTEMATIC BACTERIOLOGY. (2)

First semester. Two lecture periods a week. Prerequisite, 8 credits in microbiology. History of bacterial classification; genetic relationships; international codes of nomenclature; bacterial variation as it affects classification.

(Hansen)

### MICROB. 171. CYTOLOGY OF BACTERIA. (4)

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisites, Microb. 1, microbiology major and consent of instructor. Laboratory fee, \$15.00. A consideration of morphology, differentiation, and cytochemistry of the eubacterial organism.

(Doetsch)

**MICROB. 181. MICROBIOLOGICAL PROBLEMS. (3)**

First and second semesters. Summer session. Prerequisite, 16 credits in microbiology. Registration only upon the consent of the instructor. Laboratory fee, \$15.00. This course is arranged to provide qualified majors in microbiology and majors in allied fields an opportunity to pursue specific microbiological problems under the supervision of a member of the Department. (Faber)

*For Graduates*

**MICROB. 201. MEDICAL MYCOLOGY. (4)**

First semester. Two lecture and two two-hour laboratory periods a week. Prerequisite, 30 credits in microbiology and allied fields. Laboratory fee, \$15.00. Primarily a study of the fungi associated with disease and practice in the methods of isolation and identification. (Laffer)

**MICROB. 202. GENETICS OF MICROORGANISMS. (2)**

Second semester. Two lecture periods a week. Prerequisite, consent of instructor. An introduction to genetic principles and methodology applicable to microorganisms. Spontaneous and induced mutation, interaction between clones. (Hansen)

**MICROB. 204. BACTERIAL METABOLISM. (2)**

First semester. Two lecture periods a week. Prerequisite, 30 credits in microbiology and allied fields, including Chem. 161 and 162. Bacterial nutrition, enzyme formation, metabolic pathways and the dissimilation of carbon and nitrogen substrates. (MacQuillan)

**MICROB. 206, 208. SPECIAL TOPICS. (1-4, 1-4)**

First and second semesters. Prerequisite, 20 credits in microbiology. Presentation and discussion of fundamental problems and special subjects in the field of microbiology. (Staff)

**MICROB. 210. VIROLOGY AND TISSUE CULTURE. (2)**

Second semester. Two lecture periods a week. Prerequisite, Microb. 101 or equivalent. Characteristics and general properties of viruses and rickettsiae. Principles of tissue culture. (Hetrick)

**MICROB. 211. VIROLOGY AND TISSUE CULTURE LABORATORY. (2)**

Second semester. Two three-hour laboratory periods a week. Prerequisite, Microb. 101 or equivalent. Registration only upon consent of instructor. Laboratory fee, \$20.00. Laboratory methods in virology and tissue culture. (Hetrick)

**MICROB. 214. ADVANCED BACTERIAL METABOLISM. (1)**

Second semester. One lecture period a week. Prerequisite, Microb. 204 and consent of instructor. A discussion of recent advances in the field of bacterial metabolism with emphasis on metabolic pathways of microorganisms. (Pelczar)

**MICROB. 280. SEMINAR-RESEARCH METHODS. (1)**

First semester. Discussions and reports prepared by majors in microbiology engaged in current research; presentation of selected subjects dealing with recent advances in microbiology. (Staff)

## MOLECULAR PHYSICS

### MICROB. 282. SEMINAR-MICROBIOLOGICAL LITERATURE. (1)

Second semester. Presentation and discussion of current literature in microbiology. (Staff)

### MICROB. 399. RESEARCH.

First and second semesters. Summer session. Credits according to work done. Laboratory fee, \$15.00. The investigation is outlined in consultation with and pursued under the supervision of a senior staff member of the Department. (Staff)

## MOLECULAR PHYSICS

The Institute for Molecular Physics, a department in the College of Arts and Sciences, comprises a faculty interested in theoretical and experimental studies in the general area of molecular interaction. The Institute thus serves as an ideal place to bring together physicists and chemists to work on problems of mutual interest to the advantage of both, and the faculty is made up of members of each of these disciplines. Since the faculty of the Institute feels strongly that students should fulfill the undergraduate requirements in one of the traditional departments to insure a broad background in a fundamental subject, no undergraduate degree is offered. Members of the Institute teach both undergraduate and graduate courses in the Department of Chemistry and the Department of Physics and Astronomy and supervise thesis research of graduate students in these departments. The Institute also participates in a graduate degree program in Chemical Physics which is jointly administered by the Institute, the Department of Chemistry, and the Department of Physics and Astronomy. This program is described in the Graduate School catalog.

## MUSIC

*Professor and Head:* ULRICH.

*Professors:* GRENTZER, McCORKLE AND TRIMBLE.

*Associate Professors:* BERMAN, DUNHAM, JOHNSON AND SPRINGMANN.

*Assistant Professors:* BERNSTEIN, DEVERMOND, DIEMER (P.T.), EISENSTADT, GARVEY, GORDON, HALEY, HEAD, HEIM, McCLELLAND, MEYER, MONTGOMERY, NOSSAMAN, PENNINGTON AND TRAVER.

*Visiting Assistant Professors:* PEARLMAN AND SHELLEY.

*Instructors:* FANOS, GALLAGHER, LUNDSTROM, MORRISON, OLSON, PAYERLE, SKIDMORE, TATNALL, WACHHAUS AND WAKEFIELD.

The functions of the Department are (1) to help the general student develop sound critical judgment and discriminating taste in the art of music; (2) to provide professional training based on a foundation in the liberal arts; (3) to prepare the student for graduate work in the field; and (4) to prepare him to teach in the public schools. To this end, two degrees are offered: the Bachelor of Music, with a major in theory and composition, history and literature, or applied music; and the Bachelor of Arts, with a major in music. The Bachelor of Science degree, with a major in music education, is offered in the College of Education; this program, however, is administered within the Music Department.

Courses in music theory, literature, and applied music are open to all students who have completed the specified prerequisites or their equivalents. The University Bands, Chamber Chorus, Choir, Madrigal Singers, Men's Glee Club, Orchestra, and Women's Chorus, as well as the smaller ensembles, are likewise open to qualified students.

**THE BACHELOR OF MUSIC DEGREE:** The curriculum leading to the degree of Bachelor of Music is designed for students who wish to prepare for music teaching on the college level. A list of specific courses is available in the Departmental office. The course requirements in the three major areas may be summarized as follows:

<i>Major in</i>	<i>Theory and Composition</i>	<i>History and Literature</i>	<i>Applied Music</i>
Academic courses:			
Specified <sup>7</sup>	43 sem. hrs.	43 sem. hrs.	43 sem. hrs.
Unspecified	8	8	9
Theory and Literature:			
Lower Division	27	23	23
Upper Division	16	22	13
Applied Music:	26	24	32

<sup>7</sup>As specified in the General Education requirements and College requirements described elsewhere in this Bulletin. B.Mus. candidates will satisfy the General Education requirements in Fine Arts with Music 1; credit hours for this requirement are included under Theory and Literature—lower division—below. B.Mus. Candidates are not required to satisfy the College requirement, Speech 1.

## MUSIC

In addition, eight semester hours in ensemble courses, health, and physical activities.

**THE BACHELOR OF ARTS DEGREE:** The curriculum leading to the Bachelor of Arts degree with a major in music is designed for students whose interests are cultural rather than professional. The departmental requirements include nineteen semester hours in music theory, eighteen semester hours in music history and literature, ten semester hours in applied music, in addition to not more than eight semester hours in the larger ensembles. A list of specific courses is available in the Departmental office.

### MUSIC 1. INTRODUCTION TO MUSIC. (3)

Second semester. Open only to music or music education majors; other students take Music 20. Music 1 and 20 may not both be counted for credit. Three lectures per week. A study of the forms and styles of music, leading to an intelligent appreciation of the art and providing a foundation for more advanced courses in the Department of Music. (Henderson)

### MUSIC 4. MEN'S GLEE CLUB. (1)

Open to any student who can qualify. May be taken until a total of eight semester hours of credit has been earned; the music studied will cover a cycle of about eight semesters. (Traver)

### MUSIC 5. WOMEN'S CHORUS. (1)

Open to any student who can qualify. May be taken until a total of eight semester hours of credit has been earned; the music studied will cover a cycle of about eight semesters. (Traver)

### MUSIC 6. ORCHESTRA. (1)

Open to any student who can qualify. May be taken until a total of eight semester hours of credit has been earned; the music studied will cover a cycle of about eight semesters. (Head)

### MUSIC 7, 8. THEORY OF MUSIC. (3, 3)

Two lectures and three laboratory hours per week. A fundamental course in the elements of music. Study of rhythms, scales, chord structures, and tonalities through ear training, sight singing, and keyboard drill. The student must achieve a grade of "C" in Music 8 in order to register for Music 70. (Payerle)

### MUSIC 9. CHAMBER MUSIC ENSEMBLE. (1)

This course does not fulfill the ensemble requirements of the various curricula. Three laboratory hours per week. Rehearsal and performance of selected works for small ensembles of strings, winds, and piano or small vocal ensembles. May be repeated for credit; the music studied will cover a cycle of about six semesters. (Staff)

### MUSIC 10. BAND. (1)

Open to any student who can qualify. May be taken until a total of eight semester hours of credit has been earned; the music studied will cover a cycle of about eight semesters. (Henderson, Ostling)

**MUSIC 15. CHAPEL CHOIR. (1)**

Open to all students in the University, subject to the Director's approval. May be taken until a total of eight semester hours of credit has been earned.

(Springmann)

**MUSIC 16. FUNDAMENTALS FOR THE CLASSROOM TEACHER. (3)**

Open to students majoring in elementary education or childhood education; other students take Music 7. Music 7 and 16 may not both be counted for credit. The fundamentals of music theory and practice, related to the needs of the classroom and kindergarten teacher, and organized in accord with the six-area concept of musical learning.

(Fanos and Staff)

**MUSIC 20. SURVEY OF MUSIC LITERATURE. (3)**

Three lectures per week. Open to all students except music and music education majors, and may be taken by students who qualify to select courses within Group II of the American Civilization Program. Music 1 and 20 may not both be taken for credit. A study of the principles upon which music is based, and an introduction to the musical repertoires performed in America today.

(Gordon)

**MUSIC 21, 22. CLASS VOICE. (2, 2)**

Four hours per week. A laboratory course in which a variety of voices and vocal problems are represented. Principles of correct breathing as applied to singing; fundamentals of tone production and diction. Students are taught to develop their own voices. Repertoire of folk songs and songs of the Classical and Romantic periods.

(Nossaman)

**MUSIC 23, 24. CLASS PIANO. (2, 2)**

Four hours per week. Functional piano training for beginners. Development of techniques useful for school and community playing. Basic piano techniques; chord, arpeggio, and scale techniques; melody and song playing; simple accompaniments, improvisation for accompaniments and rhythms; sight reading and transposition, and playing by ear. Music 24, continuation of Music 23; elementary repertoire is begun.

(deVermond)

**MUSIC 31, 32. ADVANCED CLASS VOICE. (2, 2)**

Four hours per week. Prerequisite, Music 22 or equivalent vocal training. Continuation of Music 22, with more advanced repertoire for solo voice and small ensembles. A special section for music-education majors will include the study of methods and materials for teaching class voice.

(Pennington)

**MUSIC 33, 34. ADVANCED CLASS PIANO. (2, 2)**

Prerequisite, Music 24 or equivalent piano training. Four hours per week. Advanced keyboard techniques. Continuation of skills introduced in Music 24; transposition, modulation, and sight reading; methods of teaching functional piano. Music 34, development of style in playing accompaniments and in playing for community singing. More advanced repertoire.

(deVermond)

**MUSIC 61, 62, 63, 64, 65, 66, 67, 68. CLASS STUDY OF ORCHESTRAL AND BAND INSTRUMENTS. (2 each course)**

First and second semesters alternately. Open only to majors in music education (instrumental option). Four laboratory hours per week. A study of the instruments with emphasis on ensemble training. The student will acquire an

## MUSIC

adequate playing technique on two to four instruments, and an understanding of the acoustical and construction principles of the others. Music 61, Violin; Music 62, Cello and Bass; Music 63, Clarinet; Music 64, Flute, Oboe, Bassoon, and Saxophone; Music 65, Cornet; Music 66, Horn, Trombone, Euphonium, and Tuba; Music 67, Percussion; Music 68, Advanced Strings. (Staff)

### MUSIC 70, 71. ADVANCED THEORY OF MUSIC. (4, 4)

Prerequisite, Music 8 with a grade of at least "C." Three lectures and two laboratory hours per week. An integrated course of written harmony, keyboard harmony, and ear training. Continuation of the principles studied in Music 8 Harmonic progressions; Music 70, eighteenth-century chorale style; Music 71, nineteenth-century styles including chromatic and modulatory techniques. Realization of figured basses, and composition in the smaller forms. Advanced study of solfege, with drill in melodic, rhythmic, and harmonic dictation. Application of harmonic principles to the keyboard. (Payerle and Staff)

### MUSIC 80. CLASS STUDY OF STRING INSTRUMENTS. (2)

First semester. Open only to majors in music education (vocal option). Four laboratory hours per week. Basic principles of string playing, and a survey of all string instruments. (Berman)

### MUSIC 81. CLASS STUDY OF WIND AND PERCUSSION INSTRUMENTS. (2)

Second semester. Open only to majors in music education (vocal option). Four laboratory hours per week. A survey of wind and percussion instruments with emphasis on ensemble training. The student will acquire an adequate playing technique on one instrument and gain an understanding of the acoustical and construction principles of the others. (Ostling)

### *For Advanced Undergraduates and Graduates*

### MUSIC 120, 121. HISTORY OF MUSIC. (3,3)

Prerequisites, Music 1 or 20 and junior standing. A study of musical styles from their origins in western Europe to their present-day manifestations. The interaction of music and other cultural activities. Music 120, the Greek period to Bach; Music 121, Bach to the present. (Bernstein)

### MUSIC 125. HONORS READING COURSE. (2-3)

Prerequisites, Junior standing and consent of Honors Committee. Selected readings in the history, literature, and theory of music. The course may be repeated for credit at the discretion of the Committee. (Staff)

### MUSIC 130, 131. MUSIC LITERATURE SURVEY FOR THE NON-MAJOR. (3, 3)

Either semester may be taken separately. Prerequisite, Music 20 or the equivalent. Open to all students except music and music-education majors. Selected compositions are studied from the standpoint of the informed listener. Music 130, choral music, opera, and art song; Music 131, orchestral, chamber, and keyboard music. (Pennington, Gordon)

### MUSIC 141. MUSICAL FORM. (3)

Prerequisite, Music 70, 71. A study of the organizing principles of musical composition, their interaction in musical forms, and their functions in different styles. (Staff)

**MUSIC 143, 144. COMPOSITION. (2, 2)**

Prerequisite, Music 70, 71. Principles of musical composition, and their application to the smaller forms. Original writing in nineteenth and twentieth century musical idioms for various media. (Trimble)

**MUSIC 145, 146. COUNTERPOINT. (2, 2)**

Prerequisite, Music 70, 71. A course in eighteenth century contrapuntal techniques. Study of devices of imitation in the invention and the choral prelude. Original writing in the smaller contrapuntal forms. (Trimble)

**MUSIC 147, 148. ORCHESTRATION. (2, 2)**

Prerequisite, Music 70, 71. A study of the ranges, musical functions, and technical characteristics of the instruments, and their color possibilities in various combinations. Practical experience in orchestrating for small and large ensembles. (Trimble)

**MUSIC 150. KEYBOARD HARMONY. (2)**

First semester. One lecture and two laboratory hours per week. Prerequisite, Music 70, 71. The application to the piano keyboard of the harmonic principles acquired in Music 70, 71. Harmonization of melodies, improvisation and accompanying, playing from dictation, and transposition. (Haley)

**MUSIC 160, 161. CONDUCTING. (2, 2)**

Music 160 or equivalent is prerequisite to Music 161. A laboratory course in conducting vocal and instrumental groups. Baton technique, score reading, rehearsal techniques, tone production, style, and interpretation. Music of all periods will be introduced. (Traver)

**MUSIC 164. SOLO VOCAL LITERATURE. (3)**

Second semester. Prerequisite, Music 120, 121, or the equivalent. The study of solo vocal literature from the Baroque cantata to the art song of the present. The *Lied*, *melodie*, vocal chamber music, and the orchestral song are examined. (Pennington)

**MUSIC 165. KEYBOARD MUSIC. (3)**

First semester. Prerequisite, Music 120, 121, or the equivalent. The history and literature of harpsichord, organ, and piano music from the Baroque period to the present. Suites, sonatas, and smaller forms are studied with emphasis on changes of style and idiom. (Bernstein)

**MUSIC 166. SURVEY OF THE OPERA. (3)**

Second semester. Prerequisite, Music 120, 121, or the equivalent. A study of the music, librettos, and composers of the standard operas. (Bernstein)

**MUSIC 167. SYMPHONIC MUSIC. (3)**

First semester. Summer session. Prerequisite, Music 120, 121, or the equivalent. The study of orchestral music from the Baroque period to the present. The concerto, symphony, overture, and other forms are examined. (McCorkle)

**MUSIC 168. CHAMBER MUSIC. (3)**

Second semester. Prerequisite, Music 120, 121, or the equivalent. The history and literature of chamber music from the early Baroque period to the present. Music for trio sonata, string quartet and quintet, and combinations of piano and string instruments is studied. (Ulrich)

## MUSIC

### MUSIC 169. CHORAL MUSIC. (3)

First semester. Prerequisite, Music 120, 121, or the equivalent. The history and literature of choral music from the Renaissance to the present, with discussion of related topics such as Gregorian chant, vocal chamber music, etc. (McCorkle)

### MUSIC 175. CANON AND FUGUE. (3)

Prerequisite, Music 146 or the equivalent. Composition and analysis of the canon and fugue in the styles of the eighteenth, nineteenth, and twentieth centuries. (Trimble)

### MUSIC 180. ACOUSTICS FOR MUSICIANS. (3)

Prerequisites, Music 71 or the equivalent, and senior or graduate standing in music. The basic physics of music, acoustics of musical instruments and music theory, physiological acoustics, and musico-architectural acoustics. (Henderson)

### *For Graduates*

### MUSIC 200. ADVANCED STUDIES IN THE HISTORY OF MUSIC. (3)

First semester. Prerequisites, Music 120, 121, and consent of instructor. A critical study of one style period (Renaissance, Baroque, etc.) will be undertaken. The course may be repeated for credit, since a different period will be chosen each time it is offered. (Bernstein, McCorkle)

### MUSIC 201. SEMINAR IN MUSIC. (3)

Prerequisites, Music 120, 121, and consent of instructor. The work of one major composer (Bach, Beethoven, etc.) will be studied, with emphasis on musicological method. The course may be repeated for credit, since a different composer will be chosen each time it is offered. (Bernstein, McCorkle)

### MUSIC 202. PRO-SEMINAR IN THE HISTORY AND LITERATURE OF MUSIC. (3)

Prerequisite, Music 121. An introduction to graduate study in the history and literature of music. Bibliography and methodology of systematic and historical musicology. (Bernstein)

### MUSIC 203. SEMINAR IN MUSICOLOGY. (3)

Prerequisite, Music 121. An intensive course in one of the areas of musicology such as performance practices, history of music theory, history of notation, or ethnomusicology. Since a cycle of subjects will be studied, the course may be repeated for credit. (Bernstein, McCorkle)

### MUSIC 204. AMERICAN MUSIC. (3)

Prerequisite, Music 121. A lecture course in the history of American art music from Colonial times to the present. (McCorkle)

### MUSIC 206. ADVANCED MODAL COUNTERPOINT. (3)

Prerequisite, Music 146 or the equivalent. An intensive course in the composition of music in the style of the late Renaissance. Analytical studies of the music of Palestrina, Lasso, and Byrd. (Trimble)

**MUSIC 207. THE CONTEMPORARY IDIOM. (3)**

Prerequisite, Music 144 or the equivalent. Composition and analysis in the twentieth-century styles, with emphasis on techniques of melody, harmony, and counterpoint. (Trimble)

**MUSIC 208. ADVANCED ORCHESTRATION. (3)**

Prerequisite, Music 148 or the equivalent. Orchestration projects in the styles of Debussy, Ravel, Stravinsky, Schoenberg, Bartok, and others. (Trimble)

**MUSIC 209. SEMINAR IN MUSICAL COMPOSITION. (3)**

Prerequisite, Music 144 or the equivalent. An advanced course in musical composition. (Trimble)

**MUSIC 210. FACTORS IN MUSICAL LEARNING. (3)**

Prerequisite, Music 121 and at least one course in psychology. The psychology of intervals, scales, rhythms, and harmony. Musical hearing and creativity. The psychology of musical ability. The theory of functional music. Musical tests and measurements. (Staff)

**MUSIC 211. SPECIAL STUDIES IN MUSIC. (3)**

Prerequisite, Music 121 or the equivalent. Conference course in problems in music history, literature, and theory. May be repeated for credit. (Staff)

**MUSIC 212, 213. INTERPRETATION, PERFORMANCE, AND ANALYSIS OF THE STANDARD REPERTOIRE. (2-4, 2-4).**

Prerequisite, consent of graduate faculty in the Department. A seminar in analysis and interpretation for the graduate performer, with advanced instruction at the instrument of the works studied. In Music 213 a seminar paper and a full length recital are required. Special fee of \$40.00 per semester for each course. (Staff)

**MUSIC 215. AESTHETICS OF MUSIC. (3)**

Prerequisites, Music 121 or the equivalent and at least one course in aesthetics. A consideration of the principal theories of aesthetics as they relate to music. A study of writings in the field from Pythagoras to Langer. (Staff)

**MUSIC 218. TEACHING THE THEORY, HISTORY, AND LITERATURE OF MUSIC. (3)**

Prerequisite, consent of instructor. A course in teaching methodology, with emphasis on instruction at the college level. (Ulrich)

**MUSIC 300, 301. DOCTORAL SEMINAR IN MUSIC LITERATURE. (3, 3)**

Prerequisite, at least 12 graduate hours in music history and literature. An analytical survey of the literature of music: Section 1, keyboard music; Section 2, vocal music; Section 3, string-instrument music; Section 4, wind-instrument music. Required of all candidates for the D.M.A. degree in Literature-Performance. (Heim and Staff)

**MUSIC 305. DOCTORAL SEMINAR IN MUSIC. (3)**

Prerequisites, at least 12 graduate hours in music history and a familiarity with musicological methods and bibliography. A study of topics in music history and theory based on original research in the subject areas. Required of all candidates for the Ph.D. degree. May be repeated for credit. (McCorkle and Staff)

## APPLIED MUSIC

### MUSIC 306. ADVANCED COMPOSITION. (3)

Prerequisite, Music 209 or the equivalent, and permission of the instructor.  
Conference course in composition in the larger forms. (Trimble)

### MUSIC 312, 313, 314. INTERPRETATION, PERFORMANCE, AND PEDAGOGY. (4, 4, 4)

Prerequisite, consent of the Graduate Music faculty. A seminar in pedagogy and the pedagogical literature for the doctoral performer, with advanced instruction at the instrument, covering appropriate compositions. Required of all candidates for the D.M.A. degree in Literature-Performance. In Music 313 a lecture recital will be required, and in Music 314 a seminar paper and full-length recital. Special fee of \$40.00 for each course. (Staff)

### MUSIC 399. THESIS RESEARCH. (3-6)

Research in Theory or History and Literature of Music, and Musical Composition. May be repeated for credit. (Staff)

## APPLIED MUSIC

*Course number.* A new student or one taking applied music for the first time at this University should register for Music X. He will receive the proper classification at the end of his first semester in the Department. Special fee of \$40.00 per semester for each applied-music course.

*Section number:* Every student taking an applied-music course should, in addition to registering for the proper course number, indicate the instrument chosen by adding a section number as follows:

Sec. 1, Piano	Sec. 10, Bassoon
Sec. 2, Voice	Sec. 11, Horn
Sec. 3, Violin	Sec. 12, Trumpet
Sec. 4, Viola	Sec. 13, Trombone
Sec. 5, Cello	Sec. 14, Tuba
Sec. 6, Bass	Sec. 15, Euphonium
Sec. 7, Flute	Sec. 16, Organ
Sec. 8, Oboe	Sec. 17, Percussion
Sec. 9, Clarinet	Sec. 18, Saxophone

### MUSIC 12, 13. APPLIED MUSIC. (2-4 HOURS EACH COURSE)

Freshman course. One hour lesson and six practice hours per week if taken for two hours credit; or one hour lesson and fifteen practice hours per week if taken for four hours credit. The four-hour course is for piano majors in the B. Mus. curriculum only. Special fee of \$40.00 per semester. (Staff)

### MUSIC 52, 53. APPLIED MUSIC. (2-4 HOURS EACH COURSE)

Sophomore course. Prerequisite, Music 13 on the same instrument. One hour lesson and six practice hours per week if taken for two hours credit; or one hour lesson and fifteen practice hours per week if taken for four hours credit. The four-hour course is for instrumental majors in the B. Mus. curriculum only. Special fee of \$40.00 per semester. (Staff)

**MUSIC 112, 113. APPLIED MUSIC. (2-4 HOURS EACH COURSE)**

Junior course. Prerequisite, Music 53 on the same instrument. One hour lesson and six practice hours per week if taken for two hours credit; or one hour lesson and fifteen practice hours per week if taken for four hours credit. The four-hour course is for instrumental majors in the B. Mus. curriculum only. Special fee of \$40.00 per semester. (Staff)

**MUSIC 152, 153. APPLIED MUSIC. (2-4 HOURS EACH COURSE)**

Senior course. Prerequisite, Music 113 on the same instrument. One hour lesson and six practice hours per week if taken for two hours credit; or one hour lesson and fifteen practice hours per week if taken for four hours credit. The four-hour course is for instrumental or vocal majors in the B. Mus. curriculum only. Special fee of \$40.00 per semester. (Staff)

## PHILOSOPHY

*Professor and Head:* SCHLARETZKI.

*Visiting Professor:* BRODBECK.

*Associate Professor:* PASCH.

*Visiting Associate Professors:* ALEXANDER AND WIEMAN.

*Assistant Professors:* BROWN AND CELARIER.

*Lecturers:* GOLDSTONE, KRESS, ROELOFS AND VARNEDOE.

The undergraduate course offerings of the Department of Philosophy are, as a group, intended both to satisfy the needs of persons wishing to make philosophy their major field and to provide ample opportunity for other students to explore the subject. In general, the study of philosophy can contribute to the education of the university student by giving him experience in critical and imaginative reflection on fundamental concepts and principles, by acquainting him with some of the philosophical beliefs which have influenced and are influencing his own culture, and by familiarizing him with some classic philosophical writings through careful reading and discussion of them. Courses designed with these objectives primarily in mind are Philosophy 1 (Introduction to Philosophy), Philosophy 41 (Elementary Logic and Semantics), Philosophy 45 (Ethics), Philosophy 53 (Philosophy of Religion), and the historical courses 101 through 105.

For students interested particularly in philosophical problems arising within their own special disciplines, a number of appropriate courses are available: Philosophy 52 (Philosophy in Literature), Philosophy 130 (The Conflict of Ideals in Western Civilization), Philosophy 141 (Philosophy of Language), Philosophy 147 (Philosophy of Art), Philosophy 152 (Philosophy of History), Philosophy 154 (Political and Social Philosophy), Philosophy 156 (Philosophy of Science), and Philosophy 176 (Induction and Probability).

## PHILOSOPHY

The departmental requirements for a major in philosophy are as follows:

- (1) a total of at least 27 hours in philosophy, not including Philosophy 1;
- (2) Philosophy 45, 101, 102, and 104, and either 41 or 155;
- (3) a grade of "C" or better in each course counted toward the fulfillment of the major.

Students who plan to undertake graduate studies in philosophy are urged to include Philosophy 155, 169, and 171 in their programs.

For students of exceptional ability and interest in philosophy the Department offers an Honors Program. Information regarding this special curriculum may be obtained from the departmental advisers.

### PHIL. 1. INTRODUCTION TO PHILOSOPHY. (3)

An introduction to some of the main problems of philosophy, and to some of the main ways of dealing with these problems. (Staff)

### PHIL. 41. ELEMENTARY LOGIC AND SEMANTICS. (3)

An introductory study of logic and language, intended to help the student increase his ability to employ language with understanding and to reason correctly. Topics treated include the use and abuses of language, techniques for making sound inferences, and the logic of science. (Staff)

### PHIL. 45. ETHICS. (3)

An introduction to moral philosophy, including a critical examination of some important classic and contemporary systems of ethics, such as those of Aristotle, Kant, Mills, and Dewey. (Staff)

### PHIL. 52. PHILOSOPHY IN LITERATURE. (3)

Second semester. Reading and philosophical criticism of novels and dramas containing ideas significant for ethics, social policy, and religion. (Staff)

### PHIL. 53. PHILOSOPHY OF RELIGION. (3)

First semester. This course seeks to provide the student with the means by which he may approach intelligently the main problems of religious thought: the nature of religious experience, the forms of religious expression, the conflicting claims of religion and science, and the place of religion in the community and in the life of the individual. (Brown, Roelofs)

### PHIL. 101. ANCIENT PHILOSOPHY. (3)

First semester. Prerequisites, Phil. 1 and either one additional course in philosophy or senior standing. A history of Greek thought from its beginnings to the time of Justinian. The chief figures discussed: The Presocratic philosophers, Socrates, Plato, Aristotle, Epicurus, the Stoic philosophers, and Plotinus. (Celarier, Varnedoe)

### PHIL. 102. MODERN PHILOSOPHY. (3)

Second semester. Prerequisites, Phil. 1 and either one additional course in philosophy or senior standing. A history of philosophical thought in the West during the 16th, 17th, and 18th centuries. The chief figures discussed: Bacon, Galileo, Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. (Staff)

**PHIL. 103. NINETEENTH CENTURY PHILOSOPHY. (3)**

Second semester. Prerequisites, Phil. 1 and either one additional course in philosophy or senior standing. A survey of philosophy in the nineteenth century through a consideration of such writers as Hegel, Schopenhauer, Nietzsche, Spencer, Marx, Comte, Mill, Mach, and Bradley. (Staff)

**PHIL. 104. TWENTIETH CENTURY PHILOSOPHY. (3)**

First semester. Prerequisites, Phil. 1 and either one additional course in philosophy or senior standing. A survey of philosophy in the twentieth century through a consideration of representative figures in England, Europe, and America. Among the theories to be studied are logical atomism (Russell, Wittgenstein), positivism (Carnap, Ayer), existentialism and phenomenology (Sartre, Husserl), naturalism and realism (Dewey, Santayana). (Brown)

**PHIL. 105. PHILOSOPHY IN AMERICA. (3)**

Second semester. Prerequisite, Phil 1. A survey of philosophical thought in America from the eighteenth century to the present. Special attention is given to Edwards, Jefferson, Emerson, Royce, Peirce, James, and Dewey. (Schlaretzki)

**PHIL. 120. ORIENTAL PHILOSOPHY. (3)**

Prerequisite, one course in philosophy. Not offered on College Park campus. An examination of the major philosophical systems of the East, attempting to discover the relations between these and important ideas of Western thought.

**PHIL. 123, 124. PHILOSOPHIES MEN LIVE BY. (3, 3)**

Not offered on College Park campus. An exploration of the fundamental beliefs which determine what men make of their lives and of the world they live in. Classic statements of these beliefs by great philosophers will be chosen for class discussion on the basis of their significance for the problems confronting modern man.

**PHIL. 130. THE CONFLICT OF IDEALS IN WESTERN CIVILIZATION. (3)**

First semester. A critical and constructive philosophical examination of the assumptions, goals, and methods of contemporary democracy, fascism, socialism, and communism, with special attention to the ideological conflict between the U.S.A. and the U.S.S.R. (Staff)

**PHIL. 141. PHILOSOPHY OF LANGUAGE. (3)**

Prerequisite, Phil. 41. An inquiry into the nature and function of language and other forms of symbolism. (Kress)

**PHIL. 147. PHILOSOPHY OF ART. (3)**

An examination of the fundamental concepts in art and in esthetic experience generally. Readings from the works of artists, estheticians, critics and philosophers. (Brown)

**PHIL. 151. ETHICAL THEORY. (3)**

Prerequisite, Phil. 45. Contemporary problems having to do with the meaning of the principal concepts of ethics and with the nature of moral reasoning. (Schlaretzki)

**PHIL. 152. PHILOSOPHY OF HISTORY. (3)**

First semester. An examination of the nature of historical knowledge and historical explanation, and of theories of the meaning of world history. (Staff)

## PHILOSOPHY

### PHIL. 154. POLITICAL AND SOCIAL PHILOSOPHY. (3)

Second semester. A systematic treatment of the main philosophical issues encountered in the analysis and evaluation of social (especially political) institutions. (Schlaretzki)

### PHIL. 155. SYMBOLIC LOGIC. (3)

Phil. 41 or Math. 3 recommended but not required. An introduction to the concepts and techniques of modern formal logic by means of matrix and axiomatic developments of the sentential calculus and an examination of the first-order predicate calculus in a system of natural deduction. (Pasch)

### PHIL. 156. PHILOSOPHY OF SCIENCE. (3)

Prerequisites, Phil. 41 and either 101 or 102; or consent of instructor. An inquiry into the relations of the sciences, the nature of observation, hypotheses, verification, experiment, measurement, scientific laws and theories, the basic concepts and presuppositions of science, and the relations of science to society. (Staff)

### PHIL. 157. THEORY OF MEANING. (3)

Prerequisites, Phil. 41 and 102. A study of theories about the meaning of linguistic expressions, including the verification theory and the theory of meaning as use. Among topics to be considered are naming, referring, synonymy, intension and extension, and ontological commitment. Such writers as Mill, Frege, Russell, Lewis, Carnap, Wittgenstein, Austin, and Quine will be discussed. (Staff)

### PHIL. 169. TOPICS IN CONTEMPORARY PHILOSOPHY. (3)

Prerequisite, Phil. 102. An intensive examination of contemporary problems and issues. Source material will be selected from recent books and articles. May be repeated for credit when the topics dealt with are different. (Staff)

### PHIL. 170. METAPHYSICS. (3)

First semester. Prerequisites, Phil. 101 and 102. Phil. 41 recommended. A study of some central metaphysical concepts (such as substance, relation, causality, and time) and of the nature of metaphysical thinking. (Pasch)

### PHIL. 171. THEORY OF KNOWLEDGE. (3)

Second semester. Prerequisites, Phil. 101 and 102. Phil. 41 recommended. The origin, nature, and validity of knowledge will be considered in terms of some philosophic problems about perceiving and thinking, knowledge and belief, thought and language, truth and confirmation. (Pasch)

### PHIL. 175. TOPICS IN SYMBOLIC LOGIC. (3)

Prerequisite, Phil. 155. May be repeated for credit when the topics dealt with are different. (Staff)

### PHIL. 176. INDUCTION AND PROBABILITY. (3)

Prerequisite, consent of instructor. A study of inferential forms, with emphasis on the logical structure underlying such inductive procedures as estimating and hypothesis-testing. Decision-theoretic rules relating to induction will be considered, as well as classic theories of probability and induction. (Staff)

### PHIL. 180. THE PHILOSOPHY OF PLATO. (3)

First semester. Prerequisites, Phil. 101 and 102. A critical study of selected dialogues. (Celarier)

**PHIL. 181. THE PHILOSOPHY OF ARISTOTLE. (3)**

Second semester. Prerequisites, Phil. 101 and 102. A critical study of selected portions of Aristotle's writings. (Celarier)

**PHIL. 182. MEDIEVAL PHILOSOPHY. (3)**

Prerequisite, Phil. 101 or 102. A history of philosophic thought in the West from the close of the Classical period to the Renaissance. Based on readings of the Stoics, early Christian writers, Neoplatonists, later Christian writers and Schoolmen. (Celarier)

**PHIL. 184. THE CONTINENTAL RATIONALISTS. (3)**

Prerequisites, Phil. 101 and 102. A critical study of the systems of some of the major 17th and 18th century rationalists, with special reference to Descartes, Spinoza, and Leibniz. (Staff)

**PHIL. 185. THE BRITISH EMPIRICISTS. (3)**

Prerequisites, Phil. 101 and 102. A critical study of selected writings of Locke, Berkeley, and Hume. (Staff)

**PHIL. 186. THE PHILOSOPHY OF KANT. (3)**

Prerequisites, Phil. 101 and 102. A critical study of selected portions of Kant's writings. (Staff)

**PHIL. 190. HONORS SEMINAR. (3)**

Each semester. Open to honors students in philosophy and, by permission of the instructor, to honors students in other departments. Research in selected topics, with group discussion. May be repeated for credit when the topics dealt with are different. (Staff)

**PHIL. 191, 192, 193, 194. TOPICAL INVESTIGATIONS. (1-3)**

(Staff)

**PHIL. 255. SEMINAR IN THE HISTORY OF PHILOSOPHY. (3)**

Prerequisite, consent of instructor.

(Staff)

**PHIL. 256. SEMINAR IN THE PROBLEMS OF PHILOSOPHY. (3)**

Prerequisite, consent of instructor.

(Staff)

**PHIL. 260. SEMINAR IN ETHICS. (3)**

Prerequisite, consent of instructor.

(Schlaretzki)

**PHIL. 261. SEMINAR IN ESTHETICS. (3)**

Prerequisite, consent of instructor.

(Brown)

**PHIL. 270. SEMINAR IN METAPHYSICS. (3)**

Prerequisite, consent of instructor.

(Staff)

**PHIL. 271. SEMINAR IN THEORY OF KNOWLEDGE. (3)**

Prerequisite, consent of instructor.

(Pasch)

**PHIL. 292. SELECTED PROBLEMS IN PHILOSOPHY. (1-3)**

Each semester. Prerequisite, consent of instructor.

(Staff)

**PHIL. 399. RESEARCH IN PHILOSOPHY. (1-12)**

Each semester.

(Staff)

## PHYSICS AND ASTRONOMY

*Professor and Chairman:* LASTER.

*Professors:* DAY, ESTABROOK, FERRELL, FRIEDMAN (P.T.), GRIEM, HAYWARD (P.T.), HOLMGREN, HORNYAK, MACDONALD, F. McDONALD (P.T.), MARION, MUSEN (P.T.), MYERS, RADO (P.T.), SLAWSKY (P.T.), SNOW, STERN, SUCHER, WEBER, WESTERHOUT AND YODH.

*Research Professors:* MASON,<sup>9</sup> MONTROLL,<sup>8</sup> OPIK, PAI,<sup>8</sup> TIDMAN,<sup>8</sup> SCHAMP,<sup>9</sup> VANDERSLICE<sup>8</sup> AND WESKE.<sup>8</sup>

*Visiting Professors:* EDEN AND HORIE.

*Associate Professors:* ALLEY, BENNETT (P.T.), DETENBECK, J. R. DIXON (P.T.), EARL, ERICKSON, FALK, GLASSER, GLOVER, GREENBERG, MISNER, ONEDA, PRANGE, PUGH, SMITH, STEINBERG, VAN WIJK, WALL, ZIPOY AND G. ZORN.

*Research Associate Professors:* BENESCH,<sup>9</sup> FALLER<sup>8</sup> AND WILKERSON.<sup>8</sup>

*Visiting Associate Professors:* EBERHAGEN AND KOMESAROFF.

*Assistant Professors:* ANDERSON, ARMSTRONG, BARDASIS, BETTINGER, BEALL, BELL, BHAGAT, BLOCK, CONDON, DESILVA, DiLAVORE, DORFMAN,<sup>8</sup> DRAGT, FIVEL, GLICK, GUTSCHE (P.T.), HAGGE (P.T.), KACSER, KEHOE, KIM, KOCH, LEIBOWITZ, PATI, WHATLEY, WOO, WOODS, ZAPOLSKY AND B. S. ZORN.

*Research Assistant Professors:* CHARATIS, DE ROCCO,<sup>9</sup> GUERNSEY,<sup>9</sup> KRISHER,<sup>9</sup> KOOPMAN,<sup>8</sup> AND LASHINSKY.<sup>8</sup>

*Visiting Assistant Professors:* GUSS AND YOUNG.

*Research Associates:* BERES, BURN, CARMELI, CLEM, W. G. DIXON, KORNEMANN, KUNZE, LINCKE, POULTNEY, RABINOVITCH, RESNIKOFF, RICHARD, SAIEDY AND WHITE.

*Visiting Lecturers:* FICHTEL AND MECKLER.

The physics curriculum for the B.S. degree is designed for students who desire education in the fundamentals of physics in preparation for graduate work or teaching, or for positions in governmental and industrial laboratories. Students who enter the University intending to major in physics are urged to take, during the first two years, the introductory courses Physics 15, 16, 17, 18, and 60, 61. For students who enter the physics major in their junior year, however, Physics 20, 21, 60, 104, 105 and 106 may be substituted for the Physics 15-61 sequence. All students should accompany

---

<sup>8</sup> Member of the Institute for Fluid Dynamics and Applied Mathematics

<sup>9</sup> Member of the Institute of Molecular Physics

these basic courses with Math. 19, 20, 21, and 22 (4, 4, 4, 4), (or the corresponding honors courses) and one advanced mathematics course. Physics majors are encouraged to try to enroll in the accelerated honors sections of all of these courses when they are qualified.

After completion of the courses mentioned above, the Physics majors will be required to take the following courses: Physics 127, 128—Elements of Mathematical Physics (4, 4), Physics 118—Introduction to Modern Physics (3), and Physics 119—Modern Physics (3); and at least two semesters of advanced laboratory courses (e.g., Physics 100, 109, 110, 140, 141, or 190). Supporting courses must include at least one additional mathematics course approved by the physics adviser (which is usually Mathematics 110 or Mathematics 162). At least 38 credits in physics normally are required.

The departmental requirement is at least a "C" in each semester of the first year of the introductory course. Students who wish to be recommended for graduate work must maintain a "B" average and should also include as many as possible of the following courses: Physics 120—Nuclear Physics (4), Physics 122—Properties of Matter (4), Physics 140, 141—Atomic and Nuclear Physics Laboratory (3, 3), Physics 144, 145—Methods of Theoretical Physics (4, 4), and Mathematics 110, 111—Advanced Calculus (4, 4).

Recommended course programs are available from the Department.

**HONORS IN PHYSICS:** The honors program offers to students of exceptional ability and interest in physics an educational program with a number of special opportunities for learning. Honors sections are offered in several courses, and there are many opportunities for part-time research participation which may develop into full-time summer projects. An honors seminar is offered for advanced students; credit may be given for independent work or study; and certain graduate courses are open for credit toward the bachelor's degree.

Students for the Honors Program are accepted by the Department's Honors Committee on the basis of recommendations from their advisers and other faculty members. A final written and oral comprehensive examination in the senior year concludes the program which may lead to graduation "with Honors (or High Honors) in Physics."

**CHEMICAL PHYSICS:** See Molecular Physics, page 88.

#### PHYS. 1. ELEMENTS OF PHYSICS: MECHANICS, HEAT, AND SOUND. (3)

Three lectures a week. Prerequisite, successful passing of the qualifying examination in elementary mathematics. Lecture demonstration fee, \$3.00. The first half of a survey course in general physics. *This course is for the general student and does not satisfy the requirements of the professional schools.* (Alley)

## PHYSICS AND ASTRONOMY

### PHYS. 2. ELEMENTS OF PHYSICS: MAGNETISM, ELECTRICITY, AND OPTICS. (3)

Three lectures a week. Prerequisite, Phys. 1. Lecture demonstration fee, \$3.00. The second half of a survey course in general physics. *This course is for the general student and does not satisfy the requirements of the professional schools.* (Alley)

### PHYS. 3. INTRODUCTION TO PHYSICS. (4)

Three lectures and one two-hour laboratory per week. Prerequisite, qualification to enter Math. 10. Intended for students majoring in neither the physical nor biological sciences. A study of the development of some of the basic ideas of physical science. Laboratory fee, \$10.00. (Beall)

### PHYS. 10, 11. FUNDAMENTALS OF PHYSICS. (4, 4)

Three lectures, one recitation, and one two-hour laboratory period a week. Prerequisite, entrance credit in trigonometry or Math. 11 or concurrent enrollment in Math 18. Lecture demonstration and laboratory fee, \$10.00 per semester. A course in general physics treating the fields of mechanics, heat, sound, electricity, magnetism, optics, and modern physics. *This course satisfies the minimum requirements of medical and dental schools.* (Yodh, Koch, Estabrook, Stern, and Staff)

### PHYS. 15, 16. INTRODUCTORY PHYSICS: MECHANICS, FLUIDS, HEAT, AND SOUND. (4, 4)

Three lectures and two demonstration periods a week. Prerequisites, a high school physics course and concurrent enrollment in Math. 18, 19, or consent of instructor. Lecture demonstration fee, \$3.00 per semester. The first half of a broad, detailed introduction to physics, intended primarily for physics majors and other students with superior backgrounds in mathematics and the sciences. (Whatley, Leibowitz, Wall)

### PHYS. 17. INTRODUCTORY PHYSICS: ELECTRICITY AND MAGNETISM. (4)

Three lectures and two demonstration periods a week. Prerequisites, Phys. 15, 16 and previous or concurrent enrollment in Phys. 60 and Math. 20. Lecture demonstration fee, \$3.00. The third quarter of a broad, detailed introduction to physics, intended primarily for physics majors and other students with superior backgrounds in mathematics and the sciences. (Hornyak)

### PHYS. 18. INTRODUCTORY PHYSICS: OPTICS AND MODERN PHYSICS. (4)

Second semester. Three lectures and two demonstration periods a week. Prerequisites, Phys. 17 and previous or concurrent enrollment in Phys. 60 and Math. 21, or consent of instructor. Lecture demonstration fee, \$3.00. The last quarter of a broad, detailed introduction to physics, intended primarily for physics majors and other students with superior backgrounds in mathematics and the sciences. (Hornyak)

### PHYS. 20. GENERAL PHYSICS: MECHANICS, HEAT, AND SOUND. (5)

Three lectures, two recitations and one two-hour laboratory period a week. Math. 20 to be taken concurrently. Lecture demonstration and laboratory fee, \$10.00. The first half of a course in general physics. *Required of all students in the engineering curricula.* (Day, Eastabrook, Fivel, Kacser, MacDonald, and Staff)

## PHYSICS AND ASTRONOMY

### PHYS. 21. GENERAL PHYSICS: ELECTRICITY, MAGNETISM, AND OPTICS. (5)

Three lectures, two recitations, and one two-hour laboratory period a week. Prerequisite, Phys. 20. Math. 21 to be taken concurrently. Lecture demonstrations and laboratory fee, \$10.00. The second half of a course in general physics. *Required of all students in the engineering curricula.*

(Day, Eastabrook, Fivel, Kacser, MacDonald, and Staff)

### PHYS. 50, 51. INTERMEDIATE PHYSICS. (2, 2)

First and second semesters. Two lectures a week. Prerequisite, Phys. 11 or 21. (Whatley)

### PHYS. 52. HEAT. (3)

First semester. Three lectures a week. Prerequisite, Phys. 11 or 21. Math. 20 is to be taken concurrently. (Schamp)

### PHYS. 53. NUCLEAR PHYSICS AND RADIOACTIVITY. (3)

Three lectures a week. Prerequisite, Phys. 11 or 21. (Young)

### PHYS. 54. SOUND. (3)

(Will be given only with sufficient demand.) Three lectures a week. Prerequisite, Phys. 11 or 21. Math. 21 is to be taken concurrently. (Myers)

### PHYS. 60, 61. INTERMEDIATE PHYSICS EXPERIMENTS. (2, 2)

Four hours of laboratory work per week. Prerequisite, Phys. 11 or 21 or concurrent enrollment in Phys. 17 or Phys. 18. Laboratory fee, \$10.00 per semester. Selected experiments. (Block, Poultney)

### PHYS. 100. ADVANCED EXPERIMENTS. (2 credits per semester)

Four hours of laboratory work per week. Prerequisite, four credits of Phys. 60 or consent of instructor. Laboratory fee, \$10.00 per semester. Selected fundamental experiments in electricity and magnetism, elementary electronics, and optics. (Glover, Pugh)

### PHYS. 102. OPTICS. (3)

Second semester. Three lectures a week. Prerequisites, Phys. 11 or 21 and Math. 21. It is suggested, but not required, that Phys. 60 or Phys. 100 be taken concurrently with this course. Geometrical optics, optical instruments, wave motion, interference and diffraction, and other phenomena in physical optics. (Erickson)

### PHYS. 103. APPLIED OPTICS. (3)

(Will be given only with sufficient demand.) Three lectures a week. Prerequisite, Phys. 102. A detailed study of physical optics and its applications. (Alley)

### PHYS. 104, 105. ELECTRICITY AND MAGNETISM. (3, 3)

Three lectures a week. Prerequisites, Phys. 11 or 21; Math. 21. Electrostatics, direct current and alternating current circuitry, electromagnetic effects of steady currents, electromagnetic induction, radiation, development of Maxwell's equations, Poynting vector, wave equations, and electronics. (Steinberg)

## PHYSICS AND ASTRONOMY

### PHYS. 106, 107. THEORETICAL MECHANICS. (3, 3)

Three lectures a week. Prerequisite, Phys. 51 or consent of instructor. A detailed study of Newtonian mechanics. Dynamics, the motion of rigid bodies, oscillation problems, etc., are studied. Lagrange's equation of the first kind and the Hamilton-Jacobi equation are introduced. (Marion)

### PHYS. 109. ELECTRONIC CIRCUITS. (4)

Second semester. Three hours of lecture and two of laboratory per week. Prerequisite, Physics 100 and concurrent enrollment in Physics 105 or Physics 128. Theory of semi-conductor and vacuum tube circuits. Laboratory fee, \$10.00. Application in experimental physics. (Condon)

### PHYS. 110. SPECIAL LABORATORY PROJECTS IN PHYSICS. (1, 2, or 3)

Two hours laboratory work a week for each credit hour. One to three credits may be taken concurrently each semester. (Will be given only with sufficient demand.) Prerequisite, Phys. 100 and consent of adviser. Laboratory fee, \$10.00 per credit hour. Selected advanced experiments. (Glover, Pugh)

### PHYS. 111. PHYSICS SHOP TECHNIQUES. (1)

First semester. One three-hour laboratory per week. Prerequisite, Phys. 100 or consent of instructor. Laboratory fee, \$10.00. Machine tools, design and construction of laboratory equipment. (Horn)

### PHYS. 114, 115. INTRODUCTION TO BIOPHYSICS. (2, 2)

(Will be given only with sufficient demand.) Two lectures a week. Prerequisites, intermediate physics and Math. 21. A study of the physical principles involved in biological processes, with particular emphasis on current research in biophysics. (Montroll)

### PHYS. 116, 117. INTRODUCTION TO FLUID DYNAMICS. (3, 3)

Three lectures a week. Prerequisites, Phys. 106 and Math. 21. Kinematics of fluid flow, properties of incompressible fluids, complex variable methods of analysis, wave motions. (Koopman)

### PHYS. 118. INTRODUCTION TO MODERN PHYSICS. (3)

Three lectures a week. Prerequisites, general physics and integral calculus, with some knowledge of differential equations and a degree of maturity as evidenced by having taken one or more of the courses Phys. 50 through Phys. 110. Introductory discussion of special relativity, origin of quantum theory, Bohr atom, wave mechanics, atomic structure, and optical spectra. (Myers, Zorn)

### PHYS. 119. MODERN PHYSICS. (3)

Three lectures a week. Prerequisite, Phys. 118. A survey of nuclear physics, x-rays, radioactivity, wave mechanics, and cosmic radiation. (Bardasis, Zorn)

### PHYS. 120. NUCLEAR PHYSICS. (4)

Four lectures a week. Prerequisite, Phys. 119. An introduction to nuclear physics at the pre-quantum-mechanics level. Properties of nuclei; radioactivity; nuclear systematics; nuclear moments; the shell model, interaction of charged particles and gamma rays with matter; nuclear detector; accelerators; nuclear reactions; beta decay; high energy phenomena. (Holmgren)

**PHYS. 121. NEUTRON PHYSICS AND FISSION REACTORS. (4)**

Four lectures a week. Prerequisite, Phys. 120. Neutron diffusion and reactor physics. (Marion)

**PHYS. 122. PROPERTIES OF MATTER. (4)**

Each semester. Four lectures a week. Prerequisite, Phys. 119 or equivalent. Introduction to solid state physics. Electro-magnetic, thermal, and elastic properties of metals, semiconductors and insulators. (Glover, E. Stern)

**PHYS. 123. INTRODUCTION TO ATMOSPHERIC AND SPACE PHYSICS. (3)**

Second semester. Three lectures a week. Prerequisite, Physics 127 and Physics 118 or consent of instructor. Motions of charged particles in magnetic fields, aspects of plasma physics related to cosmic rays and radiation belts, atomic phenomena in the atmosphere, thermodynamics and dynamics of the atmosphere. (Bettinger, Laster)

**PHYS. 126. KINETIC THEORY OF GASES. (3)**

Three lectures a week. Prerequisites, Phys. 107 and Math. 21. Dynamics of gas particles, Maxwell-Boltzmann distribution, diffusion, Brownian motion, etc. (Mason)

**PHYS. 127, 128. ELEMENTS OF MATHEMATICAL PHYSICS.**

Mechanics, Potential Theory, and Electromagnetic Waves (4, 4). First and second semesters. Prerequisite, Physics 18 and Mathematics 21, or consent of instructor. A careful study of mathematical approaches used in mechanics, electricity and magnetism, and physical optics. (Dragt)

**PHYS. 130, 131. BASIC CONCEPTS OF PHYSICS. (2, 2)**

Two lectures a week. Prerequisite, junior standing. Lecture demonstration fee, \$2.00 per semester. A primarily descriptive course intended mainly for those students in the liberal arts who have not had any other course in physics. This course does not satisfy the requirements of professional school nor serve as a prerequisite or substitute for other physics courses. The main emphasis in the course will be on the concepts of physics, their evolution and their relations to other branches of human endeavor. (Armstrong)

**PHYS. 140, 141. ATOMIC AND NUCLEAR PHYSICS LABORATORY. (3, 3)**

One lecture and four hours of laboratory a week. Prerequisites, two credits of Phys. 100 and consent of instructor. Laboratory fee, \$10.00 per semester. Classical experiments in atomic physics and more sophisticated experiments in current techniques in nuclear physics. Enrollment is limited to ten students. (Earl)

**PHYS. 144, 145. METHODS OF THEORETICAL PHYSICS. (4, 4)**

Prerequisite, Physics 127, 128. A survey of basic ideas in thermodynamics and statistical mechanics. An introduction to electrodynamics, quantum mechanics, and relativity. Primary emphasis will be placed upon the mathematical methods involved in understanding those topics. (Ferrell, Griem)

**PHYS. 150. SPECIAL PROBLEMS IN PHYSICS.**

Prerequisite, major in physics and consent of adviser. Research or special study. Credit according to work done. Laboratory fee, \$10.00 per credit hour when appropriate. (Staff)

## PHYSICS AND ASTRONOMY

### PHYS. 152. INTRODUCTION TO THERMODYNAMICS AND STATISTICAL MECHANICS. (3)

Three lectures a week. Prerequisites, Mathematics 21, Physics 18 or 51, or consent of the instructor. Introduction of basic concepts in thermodynamics and statistical mechanics. (Bhagat)

### PHYS. 190. INDEPENDENT STUDIES SEMINAR.

Credit according to work done, each semester. Enrollment is limited to students admitted to the Independent Studies Program in Physics. (Staff)

### *For Graduates*

Of the courses which follow, 200, 201, 204, 205, 212, 213, 234, 235, 252, 253, 254, 255 and 258 are given every year; all others will be given according to demand.

### PHYS. 200, 201. THEORETICAL DYNAMICS. (3, 3)

Three lecture hours per week. Prerequisite, Physics 127 or equivalent. This basic course for graduate study in physics covers advanced classical mechanics, hydrodynamics, elasticity, thermodynamics, and statistical mechanics. It is normally taken concurrently with Physics 204, 205. (Myers, Glick, Misner)

### PHYS. 202, 203. ADVANCED DYNAMICS. (2, 2)

Two lectures a week. Prerequisite, Phys. 200. A detailed study of advanced classical mechanics. (Myers)

### PHYS. 204, 205. ELECTRODYNAMICS. (3, 3)

Three lecture hours per week. Prerequisite, Physics 128 or equivalent. This basic course for graduate study in physics covers electrodynamics and relativity. It is normally taken concurrently with Physics 200, 201.

(Sucher, Woods, Zipoy)

### PHYS. 206. KINETIC THEORY OF PLASMAS. (3)

Three hours of lecture per week. Prerequisite, Physics 204, 205. Knowledge of complex variable theory is also desirable. A detailed study of plasma physics. (Tidman)

### PHYS. 207. PLASMA PHYSICS. (3)

Prerequisite, Physics 204, 205. Orbit theory, transport processes, radiation, waves, stability theory. (Griem)

### PHYS. 208. THERMODYNAMICS. (3)

First semester. Three lectures per week. Prerequisite, Phys. 201. The first and second laws of thermodynamics are examined and applied to homogeneous and non-homogeneous systems, calculations of properties of matter, the derivation of equilibrium condition and phase transitions, the theory of irreversible processes. (Schamp)

### PHYS. 210. STATISTICAL MECHANICS. (3)

Second semester. Three lectures a week. Prerequisites, Phys. 119 and Phys. 201, 205. A study of the determination of microscopic behavior of matter from microscopic models. Microcanonical, canonical, and grand canonical models. Applications to solid state physics and the study of gases. (Dorfman, Montroll)

**PHYS. 212, 213. INTRODUCTION TO QUANTUM MECHANICS. (4, 4)**

Four lectures per week. Prerequisite, Phys. 200 or an outstanding undergraduate background in physics. A study of the Schrodinger equation, matrix formulations of quantum mechanics, approximation methods, scattering theory, etc., and applications to solid state, atomic, and nuclear physics.

(Zapolsky, Falk, Weber)

**PHYS. 214. THEORY OF ATOMIC SPECTRA. (3)**

Three lectures a week. Prerequisite, Phys. 213. A study of atomic spectra and structure—one and two electron spectra, fine and hyperfine structure, line strengths, line width, etc.

(Wilkerson)

**PHYS. 215. THEORY OF MOLECULAR SPECTRA. (3)**

Three lectures a week. Prerequisite, Phys. 214. The structure and properties of molecules as revealed by rotational, vibrational, and electronic spectra.

(Vanderslice)

**PHYS. 216, 217. MOLECULAR PHYSICS. (2, 2)**

Two lectures a week. Prerequisite, Phys. 213. Molecular theory of gases and liquids, ensemble theory, analysis of empirical models for molecular interactions, theory of Coulomb interactions between charge distribution.

(Benesch)

**PHYS. 218, 219. X-RAYS AND CRYSTAL STRUCTURE. (3, 3)**

Three lectures per week. Prerequisite, Phys. 201. A detailed study of crystal structure of solids and of x-rays.

(Glover)

**PHYS. 220. APPLICATION OF X-RAY AND ELECTRON DIFFRACTION METHODS. (2)**

Two laboratory periods a week. Prerequisite, concurrent enrollment in Phys. 218. The investigation of crystal structure, using x-rays and electron diffraction.

(E. Stern)

**PHYS. 221. UPPER ATMOSPHERE AND COSMIC RAY PHYSICS. (2)**

Two lectures a week. Prerequisite, Phys. 200 or consent of instructor. Structure of the atmosphere, rocket and satellite experiments, primary and secondary cosmic rays, origins of cosmic rays, geomagnetic theory.

(Laster)

**PHYS. 222, 223. BOUNDARY-VALUE PROBLEMS OF THEORETICAL PHYSICS. (2, 2)**

Prerequisite, Phys. 205.

(Falk)

**PHYS. 224, 225. SUPERSONIC AERODYNAMICS AND COMPRESSIBLE FLOW. (2, 2)**

Two lectures a week. Prerequisite, Phys. 201.

(Pai)

**PHYS. 226, 227. THEORETICAL HYDRODYNAMICS. (3, 3)**

Three lectures a week. Prerequisite, Phys. 201. A detailed study of advanced fluid dynamics.

(Burgers)

**PHYS. 228. SYMMETRY PROBLEMS IN PHYSICS. (3)**

Three lectures per week. Prerequisite, Physics 213. A study of general methods of classification of physical systems by their symmetries and invariance properties, especially in quantum field theory applications.

(Pati)

## PHYSICS AND ASTRONOMY

### PHYS. 230. SEMINAR.

Seminars on various topics in advanced physics are held each semester, with the contents varied each year. One credit for each seminar each semester.

(Staff)

### PHYS. 231. APPLIED PHYSICS SEMINAR.

(One credit for each semester.)

(Staff)

### PHYS. 232, 233. HYDROMECHANICS SEMINAR. (1, 1)

One meeting a week.

(Staff)

### PHYS. 234, 235. THEORETICAL NUCLEAR PHYSICS. (3, 3)

Three lectures a week. Prerequisite, Phys. 120; co-requisite, Physics 254. Nuclear properties and reactions, nuclear forces, two, three, and four body problems, nuclear spectroscopy, beta-decay, and related topics. (MacDonald, Beres)

### PHYS. 236. THEORY OF RELATIVITY. (3)

Three lectures a week. Prerequisite, Phys. 200. A study of Einstein's special theory of relativity and some consequences, and a brief survey of the foundations of general relativity. (Weber, Misner)

### PHYS. 238. QUANTUM THEORY—SELECTED TOPICS. (3)

Three lectures a week. Prerequisite, Phys. 213.

### PHYS. 239. ELEMENTARY PARTICLES. (3)

Three lectures a week. Prerequisite, Phys. 254. Survey of elementary particles and their properties, quantum field theory, meson theory, weak interactions, possible extensions of elementary particle theory. (Day, Snow)

### PHYS. 240, 241. THEORY OF SOUND AND VIBRATIONS. (3, 3)

Three lectures a week. Prerequisite, Phys. 201. A detailed study of acoustics and the theory of vibrations. (Weber, Zipoy)

### PHYS. 242, 243. THEORY OF SOLIDS. (3, 3)

First and second semesters. Two lectures a week. Co-requisite, Phys. 254. Properties of metals lattice vibrations and specific heats, Boltzmann, Fermi-Dirac, and Bose-Einstein statistics, free electron gas theories, band theory of metals. (Prange)

### PHYS. 245. SPECIAL TOPICS IN APPLIED PHYSICS.

(2 credits each semester.) Two lectures a week.

(Staff)

### PHYS. 246, 247. SPECIAL TOPICS IN FLUID DYNAMICS. (2, 2)

Prerequisites, advanced graduate standing and consent of the instructor.

(Burgers)

### PHYS. 248, 249. SPECIAL TOPICS IN MODERN PHYSICS. (2, 2)

Two lectures a week. Prerequisite, consent of instructor.

(Staff)

### PHYS. 252, 253. NUCLEAR STRUCTURE PHYSICS. (3, 3)

Three lecture hours per week. Prerequisite, Phys. 120 or equivalent; co-requisite, Phys. 212, 213 or consent of instructor. Nuclear structure and nuclear reactions. Two-body scatterings; nucleon-nucleon forces and the deuteron. Neutron scatter-

ing; the optical model. Reasonance reactions, phase-shift analysis, positions and properties of energy levels; the shell model. Direct reactions. Electromagnetic transitions. Photoreactions. The design of experiments; the extraction of parameters from experimental data and the comparison with nuclear models.

(Marion, Holmgren)

**PHYS. 254. ADVANCED QUANTUM MECHANICS. (3)**

Prerequisite, Physics 213. Relativistic wave equations, second quantization in many body problems and relativistic wave equations, Feynman-Dyson perturbation theory, applications to many body problems, applications to quantum electrodynamics, elements of renormalization.

(Ferrell, Kim)

**PHYS. 255. ADVANCED QUANTUM MECHANICS. (3)**

Second Semester. Prerequisite, Physics 254. Renormalizations of Lagrangian Field Theories, Lamb Shift, Positronium fine structure, T. C. P. invariance, connection between spin and statistics, broken symmetries in many body problems, soluble models, analyticity in perturbation theory, simple applications of dispersion relations.

(Kim)

**PHYS. 257. THEORETICAL METHODS IN ELEMENTARY PARTICLES. (3)**

First Semester. Co-requisite, Physics 255.

(Sucher, Oneda)

**PHYS. 258. QUANTUM FIELD THEORY. (3)**

Second Semester. Co-requisite, Physics 255. Introduction to Hilbert space, general postulates of relativistic quantum field theory, asymptotic conditions, examples of local field theory, Jost-Lehmann-Dyson representation and applications, generalized free field theory, general results of local field theory—TCP theorem, spin statistics connections, Borchers' theorems, Reeh-Schlieder theorem.

(Greenberg, Oneda)

**PHYS. 260. HIGH ENERGY PHYSICS. (3)**

Three lectures a week. Co-requisite, Phys. 254, or consent of instructor. Nuclear forces are studied by examining interactions at high energies. Meson physics scattering processes, and detailed analysis of high energy experiments.

(Snow)

**PHYS. 262, 263. AEROPHYSICS. (3, 3)**

Three lectures. Prerequisite, consent of the instructor.

(Pai)

**PHYS. 399. RESEARCH.**

Credit according to work done, each semester. Laboratory fee, \$10.00 per credit hour. Prerequisite, an approved application for admission to candidacy or special permission of the Department.

(Staff)

(For Astronomy curriculum, see under ASTRONOMY, p. 18.)

*Special Physics Courses for High School Science Teachers*

The courses in this section were especially designed for high school teachers and are not applicable to B.S., M.S., or Ph.D. degrees in physics without special permission of the Department of Physics and Astronomy. However, these courses can be included as part of a physics minor or as electives. No prerequisites are required.

## PRE-PROFESSIONAL CURRICULA

### PHYS. 118A. ATOMS, NUCLEI, AND STARS. (3)

Three lectures per week. An introduction to basic ideas of the constitution and properties of atomic and subatomic systems and of the overall structure of the universe. (Detenbeck)

### PHYS. 122A. PROPERTIES OF MATERIALS. (3)

Three lectures per week. An introduction to the study of solid state physics and the properties of fluids. (E. Stern)

### PHYS. 160A. PHYSICS PROBLEMS. (1, 2 or 3)

Lectures and discussion sessions arranged. (Di Lavore)

### PHYS. 170A. APPLIED PHYSICS. (3)

Three lectures per week. (Hornyak)

### PHYS. 199. NATIONAL SCIENCE FOUNDATION SUMMER INSTITUTE FOR TEACHERS OF SCIENCE SEMINAR. (1)

Arranged during summer session. Enrollment limited to participants in the N.S.F. Summer Institute. Laboratory fee, \$5.00. (Detenbeck, Staff)

## PRE-PROFESSIONAL CURRICULA

Within the College of Arts and Sciences there are a number of programs developed to prepare the pre-professional student. These curricula, some rather general and others quite specific, are designed to give the student the best background to succeed in his advanced training, to fill undergraduate requirements of many professional schools, and to fit in with the requirements established by the organizations associated with the respective professions.

Pre-professional programs require that the student maintain a grade point average somewhat higher than the minimum for graduation. The student may fulfill requirements by majoring in almost any discipline in the College, provided the specific requirements of the pre-professional program are met. The successful completion of the pre-professional program does not guarantee admission to professional school. Each school has its own admissions requirements and criteria, generally based upon the grade point average in the undergraduate courses, the scores in aptitude tests (Medical College Admission Test, Law Admission Test, or Dental Aptitude Test), a personal interview, and letters sent by the "Evaluation Committee" of the College. For the specific admissions requirements, the student is urged to study the catalog of the professional school of his choice.

Although completion of the Bachelor's degree is a normal prerequisite for admission, three professional schools of the University of Maryland in Baltimore—Dentistry, Law, and Medicine—have arrangements whereby a student who meets requirements detailed below may be accepted for professional school after three years (90 academic hours). For the students to be eligible for the "combined degree," the final thirty hours prior to entry

into the Schools of Dentistry, Law, and Medicine must be taken in residence in the College of Arts and Sciences. (A combined degree program in Law is also available in the College of Business and Public Administration: for details see BPA catalog.) After the successful completion of thirty hours of work in professional school, the student may be eligible for a Bachelor's degree from the College of Arts and Sciences (Arts-Dentistry, Arts-Law, or Arts-Medicine).

## PRE-DENTISTRY

The pre-dental program is based upon requirements established by the Council of Dental Education of the American Dental Association, and the requirements for a degree from the College of Arts and Sciences following either the regular four-year program or the combined "Arts-Dentistry" program. The program is designed to prepare the student for the Dental Aptitude Test, normally taken in the spring of the sophomore year.

The minimum requirements for entry into dental school for either the three-year program (90 academic hours) or the four-year program (120 academic hours) are:

General Education requirements		34 hours
College requirements		
Foreign Language	12	
Speech	2	14 hours
plus		
Major		variable
Minor (or supporting courses)		variable
Dental Association requirements		
Chemistry—organic	8	
inorganic	8	
Zoology	8	
Mathematics	6	
Physics	8	38 hours
Electives—to complete the 90 or 120 hours required.		
Required Health and Physical Education.		

*Four-Year Program.* A student applies to Dental School in his senior year, on the basis of completing the usual degree requirements for the B.A. or B.S. degree from the College of Arts and Sciences, by majoring in the field of his choice and including in his course work the science courses specifically prescribed by dental schools.

*Three-Year Arts-Dentistry Program.* Students whose performance during the first two years in residence at College Park is exceptional may be encouraged to seek admission to the University of Maryland Dental School at the end of their third year (90 academic hours). No undergraduate major is required for this program: the work of the first year of dental school is considered as the major; but students will select a minor (supporting courses) from one of the following combinations: zoology, six hours above the 100 level; microbiology, eight hours above the 100 level; Chem. 19 plus

## PRE-PROFESSIONAL CURRICULA

three hours above the 100 level in any science; Chem. 161, 162, 163, and 164; or nine hours above the 100 level in any one department of the arts, humanities, or social sciences.

Students accepted in the combined Arts-Dentistry program may receive the B.S. degree (Arts-Dentistry) after satisfactory completion of the first year of dental school, upon recommendation by the Dean of the Dental School and approval by the College of Arts and Sciences. Applications for the diploma are made during the summer following the first year of dental school, and the degree is awarded with the August graduates.

*Schedule.* The pre-dental student, regardless of degree sought, includes in his first-year schedule Chem. 1, 3; Zool. 1, 2; Engl. 1, 3; Math. 10, 11 (or 18, 19); Health 5; and Physical Education. His second year includes Chem. 35, 36, 37, 38; foreign language; general education requirements; and major-minor requirements. A student hoping for three-year acceptance would substitute Phys. 10, 11 for foreign language in his sophomore year.

## PRE-LAW

Although some law schools will consider only applicants with a B.A. or B.S. degree, others will accept applicants who have successfully completed a three-year program of academic work. Most law schools do not prescribe specific courses which a student must present for admission, but do require that the student follow one of the standard programs offered by the undergraduate college. Many law schools require that the applicant take the Law Admissions Test in the academic year preceding his entry into professional school.

*Four-Year Program.* The student who plans to complete the requirements for the B.A. or B.S. degree before entering law school should select a major field of concentration. The pre-law student ordinarily follows a Bachelor of Arts program with a major in American Studies, English, American and English history, economics, political science (government and politics), psychology, sociology or speech; a few pre-law students follow a Bachelor of Science program.

*Three-Year Arts-Law Program.* The student who plans to enter law school at the end of his third year should follow the general B.A. program during his first two years. During his junior year, he will complete the requirements for a minor (18 semester hours) in one of the fields of concentration. His program during the first three years should include all of the basic courses required for a degree from the College of Arts and Sciences (including the 18 hour minor) and all College and University requirements. The academic courses must total 90 hours, and must be passed with a minimum average of 2.0.

Students with exceptional records who are accepted to the School of Law of the University of Maryland under the Arts-Law program may receive a B.A. degree (Arts-Law) after satisfactory completion of the first year of

law school, upon recommendation by the Dean of the Law School and approval by the College of Arts and Sciences. Applications for the diploma are made during the summer following the first year of law school (or after 30 credit hours are completed), and the degree is awarded with the August graduates.

### PRE-MEDICINE

The pre-medical program is based upon the requirements established by the Association of American Medical Colleges and the requirements for a degree from the College of Arts and Sciences, either with the four-year degree program or with the combined "Arts-Medicine" program. The curriculum is designed to prepare the student for the Medical College Admission Test, which is normally taken in the spring of the junior year.

The minimum requirements for entry into medical school for either the three-year program (90 academic hours) or the four-year program (120 academic hours) are:

General Education requirements <sup>10</sup>		34 hours
College requirements		
Foreign Language	12	
Speech	2	14 hours
plus		
Major		variable
Minor (or supporting courses)		variable
Medical School requirements		
Chemistry—general inorganic	8	
organic	8	
quantitative	4	
Zoology	16	
(In addition to Zool. 1		
and 2, strongly recommended		
are two of genetics,		
embryology, comparative		
anatomy)		
Mathematics	6	
Physics	8	50 hours
Electives—to complete the 90 or 120 hours required.		
Required Health and Physical Education.		

*Four-Year Program.* No specific major is required for favorable consideration by a medical school admissions committee. By intelligent planning starting in the sophomore year, the student can meet the above requirements as well as requirements of most majors in the College of Arts and Sciences. The student is urged to work closely with his pre-medical adviser for this planning. A student who enters the pre-medical program late in his college career may find an additional year of study necessary (either as a special student or as a regular undergraduate).

<sup>10</sup> Pre-medical students must offer Philosophy 1 to fulfill the Fine Arts requirement of the General Education program.

## PRE-PROFESSIONAL CURRICULA

*Three-Year Arts-Medicine Program.* After completion of his first year of pre-medical study, an exceptional student may be encouraged to seek admission to the University of Maryland School of Medicine at the end of his third year (90 hours). During his next two years he will need to complete all requirements listed above, with the exception of the major and the regular minor. Four *additional* hours at the 100 level in appropriate science courses will satisfy the minor requirement.

Students accepted in the combined Arts-Medicine program may receive the B.S. degree (Arts-Medicine) after satisfactory completion of their training in the basic sciences at the University of Maryland School of Medicine (30 hours), upon recommendation of the Dean of the School of Medicine and approval by the College of Arts and Sciences. The degree is normally awarded in August following the *second* year of medical school.

*Schedule.* The pre-medical student normally includes in his first-year schedule Chem. 1, 3; Zool. 1, 2; Engl. 1, 3; Math. 10, 11 (or 18, 19); Health 5; and Physical Education. Academically strong students may take an additional course in their second semester. His second year includes Chem. 35, 36, 37, 38; foreign language; General Education requirements; Zool. 5, 6; and/or major requirements. His third year includes Phys. 10, 11; foreign language, General Education requirements, major requirements and minor (supporting course) requirements. Chem. 19 would be taken during the third year of the three-year applicant and during the fourth year of the four-year student. The fourth year is devoted to completion of the General Education requirements and major and minor (supporting course) requirements.

## RELATED PROFESSIONS

Academic preparation for several professions related to dentistry or medicine is available through the College of Arts and Sciences. For requirements of professional schools in dental hygiene, optometry, osteopathy, etc., see catalogs of the specialized schools; representative catalogs are available in the Office of the Dean.

*Medical Technology.* The Department of Microbiology offers a program consisting of a major in microbiology with electives in zoology which prepares a student for employment in various laboratory positions in industry or government, or for graduate work. This major also qualifies a student for the intern hospital training required for certification or registration as medical technologist (MT); a student who earns a B.S. degree in microbiology is *not* eligible for the registry examination without the necessary hospital training. A student interested only in certification as a medical technologist may complete in three years the requirements for admission to a hospital training school by proper planning of his program. After one further year of hospital training, he would be eligible for the examination given by the Registry of Medical Technologists.

*Veterinary Medicine.* The pre-veterinary program is administered by the College of Agriculture.

# PSYCHOLOGY

*Professor and Head:* ANDREWS.

*Professors:* BATTIG, BRADY (P.T.), DASTON, EDGERTON (P.T.), MCGINNIES, WALDROP.

*Associate Professors:* ANDERSON, BARTLETT, GOLLUB, HEERMANN, PUMROY, WALDER AND YARCZOWER.

*Assistant Professors:* FRETZ, GOLANN, HIGGS, HODOS (P.T.), JOHNSON, MCINTIRE, O'BRIEN, STEINMAN, TURNAGE, VETTER, WARD.

The Department of Psychology is classed in both the Division of Biological Sciences (B.S. degree) and the Division of Social Sciences (B.A. degree) and offers academic programs related to both of these fields. The undergraduate curriculum in psychology provides an organized study of the behavior of man in terms of the biological conditions and social factors which influence such behavior. In addition, the undergraduate program is arranged to provide a level of learning that will equip qualified students to pursue further study of psychology and related fields in graduate and professional schools.

Students who are interested in the biological aspects of behavior tend to choose a program leading to the B.S. degree, while those interested primarily in the social factors of behavior tend to choose a program leading to the B.A. degree. The choice of program is made in consultation with, and requires the approval of, the academic adviser.

Departmental requirements are the same for the B.S. and the B.A. degree. A minimum of 28 hours of psychology is required, including Psychology 1, 90, 150 and two from 145, 146, and 147. The additional courses will be chosen in discussion with the adviser.

A minor program of 18 hours is organized to supplement the work in the major. For the B.S. degree supporting courses in the physical and biological sciences and mathematics will be chosen, in consultation with the adviser, to constitute a coherent set of courses. Ordinarily these courses will include at least three semester courses of science and mathematics at the advanced level. A minimum of two semester courses must be laboratory courses. In addition to these 18 hours of supporting courses, the College of Arts and Sciences requires 12 hours of science and mathematics and these latter requirements are to be chosen in accordance with rules established by the College. For the B.A. degree the minor program will ordinarily consist of courses in the social sciences, although mathematics and other sciences may be included. Choice of the minor program is made in consultation with and requires the approval of the adviser. A minimum 2.0 grade average is required in the minor. No student who has ever received a second grade lower than a "C" in Psychology 1, 90 or any 100-level courses in psychology, will be certified for graduation in psychology.

## PSYCHOLOGY

**HONORS:** The Department of Psychology also offers a special program for the superior student which emphasizes independent study and research. Students may be eligible to enter the Honors Program who have a 3.3 grade average in all courses or the equivalent, who are in their junior or the first half of their senior year, and who demonstrate interest and maturity indicative of success in the program. Students should consult their adviser or the Departmental Honors Committee for further information.

### PSYCH. 1. INTRODUCTION TO PSYCHOLOGY. (3)

A basic introductory course, intended to bring the student into contact with the major problems confronting psychology and the more important attempts at their solution. (Staff)

### PSYCH. 5. PERSONALITY AND ADJUSTMENT. (3)

Prerequisite, Psych. 1. Introduction to the psychology of human personality and adjustment, with a view toward increasing self-understanding and developing an appreciation of the mental health movement and each individual's stake in it. (Staff)

### PSYCH. 21. SOCIAL PSYCHOLOGY. (3)

Prerequisite, Psych. 1. Personality and behavior as influenced by culture and interpersonal relations. Social influences on motivation, learning, memory, and perception. Attitudes, public opinion, propaganda, language and communication, leadership, ethnic differences, and group processes. (Staff)

### PSYCH. 25. CHILD PSYCHOLOGY. (3)

First semester. Prerequisite, Psych. 1. Behavioral analysis of normal development and normal socialization of the growing child. Leading theories of child nature and care, and their implications. (Staff)

### PSYCH. 26. DEVELOPMENTAL PSYCHOLOGY. (3)

First semester. Prerequisite, Psych. 1. Biological basis of behavioral development in relation to genetic, constitutional, anatomical, physiological, and environmental factors. Emphasis upon both phylogenetic and ontogenetic research findings in biological psychology. (Brady, Hodos)

### PSYCH. 90. STATISTICAL METHODS IN PSYCHOLOGY. (3)

First and second semester. Prerequisite, Psych. 1 and Math. 1, 5, or 10 or equivalent. A basic introduction to quantitative methods used in psychological research; measures of central tendency, of spread, and of correlation. (Staff)

### *For Advanced Undergraduates and Graduates*

Graduate credits will be assigned only for students certified by the Department of Psychology as qualified for graduate standing.

### PSYCH. 110. EDUCATIONAL PSYCHOLOGY. (3)

Prerequisite, Psych. 1 or equivalent. Researches on fundamental psychological problems encountered in education. Measurement and significance of individual differences; learning, motivation, transfer of training, and the educational implications of theories of intelligence. (Staff)

**PSYCH. 122. ADVANCED SOCIAL PSYCHOLOGY. (3)**

Second semester. Prerequisites, Psych. 21 and 90 or consent of instructor. A systematic review of researches and points of view in regard to major problems in the field of social psychology. (McGinnies, Higgs, Ward)

**PSYCH. 123. LANGUAGE AND SOCIAL COMMUNICATION. (3)**

Second semester. Prerequisite, Psych. 21, senior standing, and consent of instructor. The nature and significance of verbal and non-verbal communication in social psychological processes including examination of relevant theoretical approaches to symbolic behavior. (McGinnies, Higgs, Ward)

**PSYCH. 131. ABNORMAL PSYCHOLOGY. (3)**

Prerequisite, two courses in psychology, including Psych. 5. The nature, diagnosis, etiology, and treatment of mental disorders. (Staff)

**PSYCH. 136. APPLIED EXPERIMENTAL PSYCHOLOGY. (3)**

Second semester. Prerequisite, Psych. 1 or consent of instructor. A study of basic human factors involved in the design and operation of machinery and equipment. Organized for students in engineering, industrial psychology, and the biological sciences. (Anderson)

**PSYCH. 145. EXPERIMENTAL PSYCHOLOGY: SENSORY PROCESSES. (4)**

Two lectures and two two-hour laboratory periods per week. Prerequisite, Psych. 90. Laboratory fee per semester, \$4.00. Primarily for students who major or minor in psychology. A systematic survey of the laboratory methods, and techniques applied to sensory and perceptual processes. (Anderson, Steinman)

**PSYCH. 146. EXPERIMENTAL PSYCHOLOGY: LEARNING, MOTIVATION AND PROBLEM SOLVING. (4)**

Two lectures and two two-hour laboratory periods per week. Prerequisite, Psych. 90. Laboratory fee, \$4.00 per semester. Primarily for students who major or minor in psychology. The experimental analysis of learning and motivational processes. (Yarczower, Gollub, Turnage)

**PSYCH. 147. EXPERIMENTAL PSYCHOLOGY: SOCIAL BEHAVIOR. (4)**

Two lectures and two two-hour laboratory periods per week. Prerequisite, Psych. 21 and Psych. 90 or equivalent. Laboratory fee, \$4.00 per semester. A laboratory course dealing with methods of studying behavior in the social context. Topics will include social perception and motivation, small groups, communication and persuasion. Consideration will be given to the techniques involved in laboratory experimentation, field studies, attitude scale construction, and opinion surveys. (McGinnies, Higgs, Ward)

**PSYCH. 148. PSYCHOLOGY OF LEARNING. (3)**

First semester. Prerequisite, Psych. 145 and permission or Psych. 146. Review and analysis of the major phenomena and theories of human and animal learning, including an introduction to the fields of problem solving, thinking and reasoning behavior. (Staff)

**PSYCH. 150. TESTS AND MEASUREMENTS. (3)**

Prerequisite, Psych. 90. Laboratory fee, \$4.00. Critical survey of measuring devices used in counseling, educational and industrial practice with an emphasis on the theory, development and standardization. Laboratory work will incor-

## PSYCHOLOGY

porate training in methodology of test development together with appropriate practice in the use of selected tests. (Waldrop, Bartlett)

### PSYCH. 151. PSYCHOLOGY OF INDIVIDUAL DIFFERENCES. (3)

Prerequisite, Psych. 150. Problems, theories, and researches related to psychological differences among individuals and groups.

(Waldrop, Heermann, Johnson)

### PSYCH. 161. INDUSTRIAL PSYCHOLOGY. (3)

Prerequisite, 6 hours in psychology. A course designed to aid in the understanding of the problems of people in a variety of work situations; serving as an introduction to such technical problems as personnel selection interviewing, morale supervision and management, and human relations in industry. Lecture, discussion and laboratory.

(Bartlett, Heermann, O'Brien)

### PSYCH. 180. PHYSIOLOGICAL PSYCHOLOGY. (3)

First semester. Prerequisite, Psych. 145 or 146. An introduction to research on the physiological basis of human behavior, including considerations of sensory phenomena, motor coordination, emotion, drives, and the neurological basis of learning.

(Brady, McIntire, Hodos)

### PSYCH. 181. ANIMAL BEHAVIOR. (3)

Second semester. Prerequisite, consent of instructor. A study of animal behavior, including considerations of social interactions, learning, sensory processes, motivation, and experimental methods, with a major emphasis on mammals.

(McIntire)

### PSYCH. 191. SENIOR SEMINAR. (3)

First semester. Prerequisites, senior standing and consent of the instructor. The historical and theoretical roots of the science of psychology. Analysis of current psychological theories and their related research.

(Staff)

### PSYCH. 194. INDEPENDENT STUDY IN PSYCHOLOGY. (1-6)

Prerequisites, senior standing and written consent of individual faculty supervisor. Integrated reading under direction leading to the preparation of an adequately documented report on a special topic.

(Staff)

### PSYCH. 195. MINOR PROBLEMS IN PSYCHOLOGY. (1-6)

Prerequisite, written consent of individual faculty supervisor. An individualized course designed to allow the student to pursue a specialized topic or research project under supervision.

(Staff)

### *For Graduates*

(All the following courses require consent of the instructor. Not all of the graduate courses are offered every year. The times specified for each course are given as estimates.)

### PSYCH. 200. PROSEMINAR: PROFESSIONAL ASPECTS OF PSYCHOLOGICAL SCIENCE. (1)

Prerequisite, consent of faculty adviser. Survey of professional problems in psychology, including considerations of contemporary developments, professional ethics, literature resources, formulation of critical research problems, and discussion of the major institutions requiring psychological services.

(Staff)

**PSYCH. 201. SENSORY AND PERCEPTUAL PROCESSES. (3)**

Alternate years. Prerequisites, Psych. 180 and 211. The contemporary experimental and theoretical literature on selected problems in sensation and perception. (Anderson, Steinman)

**PSYCH. 203, 204. GRADUATE SEMINAR. (2, 2)**

Surveys of contemporary American and foreign research literature in specialized fields of psychology. (Staff)

**PSYCH. 205, 206. HISTORICAL VIEWPOINTS AND CURRENT THEORIES IN PSYCHOLOGY. (3, 3)**

Alternate years. Prerequisite, Psych. 212. A study of the philosophical and scientific background of modern psychology, together with a review of its major systematic viewpoints and issues. (Battig)

**PSYCH. 207. CONDITIONING AND LEARNING. (3)**

Alternate years. Prerequisite, Psych. 212. The literature on the experimental analysis of behavior, with examination of basic experiments and contemporary theories related to them. (Staff)

**PSYCH. 208. VERBAL BEHAVIOR. (3)**

Alternate years. Prerequisite, Psych. 123 and 212. Analysis of such topics as verbal learning, psycholinguistics, concept formation, and thinking. (Battig, Turnage)

**PSYCH. 211, 212. ADVANCED GENERAL PSYCHOLOGY. (3, 3)**

Prerequisite, Psych. 145 or 146. A systematic review of the more fundamental investigations upon which modern psychology is based. (Staff)

**PSYCH. 213. ADVANCED LABORATORY TECHNIQUES. (1-3)**

Methodology of the automatization of research techniques and apparatus; apparatus design and construction; telemetric and digital techniques; logical block circuitry. Laboratory fee, \$5.00 per credit hour. (Staff)

**PSYCH. 214. COMPARATIVE PSYCHOLOGY. (3)**

Prerequisite, Psych. 181 and 212. The experimental literature on the behavior of infra-human organisms. Special topics. (Yarczower, McIntire)

**PSYCH. 215. ADVANCED PSYCHOPHYSIOLOGY. (3)**

Alternate years. An advanced seminar dealing with special selected topics in the area of psychophysiology. (Brady, Hodos, McIntire)

**PSYCH. 216. SEMINAR IN PSYCHOPHARMACOLOGY. (3)**

Prerequisite, one year of graduate study in psychology and consent of the instructor. A critical review and detailed analysis of the literature and problems related to the effects of drugs on animal and human behavior. Designed for advanced graduate students in experimental psychology and clinical psychology. (Brady, Gollub)

**PSYCH. 220. PSYCHOLOGICAL CONCEPTS IN MENTAL HEALTH. (3)**

Prerequisite, advanced standing. Concepts in mental health, their theoretical status, experimental evidence, and current use. (Golann)

## PSYCHOLOGY

### PSYCH. 221. SEMINAR IN COUNSELING PSYCHOLOGY. (3)

Selected problems in counseling psychology. (Fretz, Waldrop)

### PSYCH. 222. SEMINAR IN CLINICAL PSYCHOLOGY. (3)

Selected problems in clinical psychology. (Pumroy, Daston, Walder)

### PSYCH. 223. SEMINAR IN COMMUNITY MENTAL HEALTH. (3)

Selected problems in mental health psychology. (Golann)

### PSYCH. 224. SEMINAR IN STUDENT PERSONNEL. (2)

(Same as *Ed. 228.*) Prerequisite, permission of instructor. The seminar is designed to acquaint the student with student personnel functions at the collegiate level. Attention is devoted to the historical antecedents of student personnel activities, the range of services, their functions, responsibilities, interrelationships and projected future status. Resource personnel presently engaged in student personnel services will participate as needed. (Staff)

### PSYCH. 225, 226. MEASUREMENT AND EVALUATION. (4, 4)

Prerequisite, Psych. 150. Theory and logic of the methodology of evaluation. Laboratory practice in methods of appraisal. Survey of available testing instruments and techniques. Laboratory fee of \$6.00 each semester.

(Daston, Pumroy, Walder)

### PSYCH. 229. SEMINAR IN INDUSTRIAL PSYCHOLOGY. (3)

An advanced seminar covering specialized topics such as morale and motivation, labor relations, consumer motivations, man-machine systems, quantitative and qualitative personnel requirements inventory, job evaluation, environmental conditions and safety, occupational choice and classification, and the interview. (Edgerton, Bartlett, Heermann, O'Brien)

### PSYCH. 230. SEMINAR IN ENGINEERING PSYCHOLOGY. (3)

Alternate years. An advanced seminar covering the analysis of factors, variables, and characteristics of systems which affect human performance and efficiency. (Anderson)

### PSYCH. 231. TRAINING PROCEDURES IN INDUSTRY. (3)

Prerequisite, Psych. 148 or equivalent. A consideration of psychological principles and methods for improving job performance; skill development laboratory in application of methods and techniques is provided.

(Edgerton, Bartlett, Heermann, O'Brien)

### PSYCH. 232. PERSONNEL SELECTION AND JOB ANALYSIS. (3)

Prerequisite, Psych. 161 or equivalent. Psychological measurement as applied to the analysis of job requirements and the development and use of performance criteria and predictors. (Edgerton, Bartlett, Heermann, O'Brien)

### PSYCH. 233. SOCIAL ORGANIZATION IN INDUSTRY. (3)

Analysis of management organizations as social structures, and the application of concepts and methods of social psychology to problems of conflict, cooperation, and leader-group relations. (Edgerton, O'Brien)

**PSYCH. 240. INTERVIEW AND QUESTIONNAIRE TECHNIQUES. (3)**

Psychological concepts and methods in the use of interview, questionnaire, and inventory procedures for the measurement, prediction and alternation of behavior. (Staff)

**PSYCH. 241. PERSUASION AND ATTITUDE CHANGE. (3)**

Consideration of the communication process and the various media of mass communication. Factors related to the effectiveness of communication and persuasion are analyzed in the light of experimental evidence, and various strategies and techniques of persuasion are reviewed. (McGinnies)

**PSYCH. 242. SEMINAR IN SOCIAL PSYCHOLOGY. (3)**

Analysis and discussion of contemporary systematic positions in social psychology. Review of research methods in the area as well as theories and problems of current importance. (Higgs, McGinnies, Ward)

**PSYCH. 243. SEMINAR IN SMALL GROUP BEHAVIOR. (3)**

Review of current approaches to small group behavior, including problem-solving, communication, leadership, and conformity. (Ward)

**PSYCH. 252, 253. ADVANCED STATISTICS. (3, 3)**

Prerequisite, Psych. 90. Detailed study of the fundamentals of statistical inference, experimental design, and the analysis of regression and correlation concepts and techniques; a basic course for research students in the behavioral sciences. (Staff)

**PSYCH. 254. FACTOR ANALYSIS. (3)**

Prerequisite, Psych. 253. Analysis of major developments in factor theory as applicable to the behavioral sciences, including computational methods and research implications. (Andrews)

**PSYCH. 255. SEMINAR IN PSYCHOMETRIC THEORY. (3)**

Prerequisite, Psych. 253. Study of psychophysical methods, scaling techniques, and the statistical methods of pattern analysis. (Staff)

**PSYCH. 256. MENTAL TEST THEORY. (3)**

Prerequisite, Psych. 253. Development of test theory from psychophysics and measurement theory. Consideration of formal and applied problems involved in developing and utilizing psychological tests and measurements. Special attention is given to problems of reliability, validity, and prediction. (Bartlett, Heermann)

**PSYCH. 257. SEMINAR IN QUANTITATIVE PSYCHOLOGY. (3)**

Prerequisite, Psych. 253. An advanced seminar covering special topics in statistical and mathematical methods and models in psychology. (Staff)

**PSYCH. 258. DEVELOPMENT OF PREDICTORS. (3)**

Prerequisite, Psych. 253. Review of statistical theory and practices in the design, development and analysis of techniques of prediction in the behavioral sciences, with special attention to the formal and practical problems of criteria for prediction. (Andrews, Bartlett, Heermann)

## PSYCHOLOGY

### PSYCH. 260. OCCUPATIONAL DEVELOPMENT AND CHOICE. (3)

Prerequisite, Psych. 220. Theoretical and research literature on occupational behavior. (Waldrop, Fretz)

### PSYCH. 261, 262. MODIFICATION OF HUMAN BEHAVIOR: RESEARCH METHODS AND PRACTICES. (3, 3)

The experimental and applied methods available for the induction of behavior change, with emphasis on their relationship to community mental health (first semester); process, outcome, and theory in their application to counseling and psychotherapy (second semester). (Daston, Walder)

### PSYCH. 263, 264. MODIFICATION OF HUMAN BEHAVIOR: LABORATORY AND PRACTICUM. (3, 3)

Application of methods relevant to behavior change in counseling and psychotherapy. Individual supervision and group consultation. Laboratory fee, \$6.00 per semester. (Pumroy)

### PSYCH. 265. ADVANCED DEVELOPMENTAL PSYCHOLOGY. (3)

Empirical, experimental and theoretical literature related to developmental processes. (Waldrop, Pumroy)

### PSYCH. 266. THEORIES OF MOTIVATION. (3)

Alternate years. Current treatments of motivational concepts, and analysis of the causal antecedents to behavior. (Staff)

### PSYCH. 267. THEORIES OF PERSONALITY. (3)

Scientific requirements for a personality theory. Postulates and relevant research literature for several current personality theories. (Daston, Walder)

### PSYCH. 269. PRACTICUM IN COMMUNITY MENTAL HEALTH CONSULTATION. (3)

Directly supervised fieldwork in mental health consultation. (Golann)

### PSYCH. 270. ADVANCED ABNORMAL PSYCHOLOGY. (3)

Alternate years. Deviant behaviors and their etiology and taxonomy. (Daston, Walder)

### PSYCH. 271. APPRAISAL OF DISABILITIES. (3)

Human disabilities and their psychological appraisal. (Daston, Waldrop)

### PSYCH. 272. INDIVIDUAL CLINICAL DIAGNOSIS. (3)

Alternate years. Prerequisite, Psych. 226. Case study of emotionally disturbed individuals with a variety of psychological techniques. (Staff)

### PSYCH. 274. EVALUATION AND CHANGE IN EDUCATIONAL SKILLS. (3)

Methods for the enhancement of reading and other educational skills. (Staff)

### PSYCH. 285, 286. RESEARCH METHODS IN PSYCHOLOGY. (1-3, 1-3)

Research is conducted on several problems each semester, in a variety of fields of psychology, and under the supervision of various members of the faculty. (Staff)

### PSYCH. 288, 289. SPECIAL RESEARCH PROBLEMS. (1-4, 1-4)

Supervised research on problems selected from the areas of experimental industrial, social, quantitative, or mental health psychology. (Staff)

### PSYCH. 399. RESEARCH. (CREDIT ARRANGED)

(Staff)

## SOCIOLOGY

*Professor and Head:* HOFFSOMMER.

*Professors:* JANES AND LEJINS.

*Associate Professors:* ANDERSON, CUSSLER, HIRZEL AND SHANKWEILER.

*Assistant Professors:* COATES, DI BELLA, FRANZ, HARPER, HENKEL, JONES, MOTZ, POWNALL, PRICE AND WILLIAMS.

*Instructors:* DOERR, GORDON (P.T.) AND TOLAND.

**SOCIOLOGY MAJOR:** the major in sociology leads to the B.A. degree. It offers a liberal education and at the same time provides a background for those professional fields which focus on an understanding of human relationships. A major requires 30 semester hours in sociology.

Courses required of all sociology majors are Soc. 1, 2, 95, 186 and 196. If used as a General Education requirement, Soc. 1 may not be counted for Sociology major credit. Several areas of emphasis within the sociology major are available, some with additional requirements: (1) General Sociology, (2) Community Studies (rural, urban and suburban groups and their populations), (3) Social Institutions (structure and function of social institutions including family, religious, economic, governmental and educational), (4) Social Psychology, (5) Intercultural Sociology, (6) Industrial and Occupational Sociology, (7) Sociology-Education, (8) Anthropology, (9) Crime Control Curriculum (a four year pre-professional program in the field of crime and delinquency and their control), and (10) Pre-professional Social Work Curriculum (prepares the student for admission to graduate study in a School of Social Work, and provides qualifications for certain social work positions for which post-graduate professional education is not required). A statement of course requirements and recommended courses for the above areas is available in the departmental office.

No course with a grade of less than "C" may be used to satisfy major requirements.

Students interested in an honors program should check their eligibility with the Department.

Sociology 1 or its equivalent is prerequisite to all other courses in Sociology.

### SOC. 1. INTRODUCTION TO SOCIOLOGY. (3)

This course is one of a group of four courses within Elective Group I of the American Civilization Program. It may also be taken by students who qualify by tests to select substitute courses in the program (provided the student has not taken the course as his Group I elective). Sociological analysis of the American social structure; metropolitan, small town, and rural communities; population distribution, composition and change; social organization.

(Hirzel, Price, Toland, Staff)

## SOCIOLOGY

### SOC. 2. PRINCIPLES OF SOCIOLOGY. (3)

Prerequisite, sophomore standing. The basic forms of human association and interaction; social processes; institutions; culture, human nature and personality. (Cussler, Motz, Franz, Jones, Toland)

### SOC. 13. RURAL SOCIOLOGY. (3)

First semester. Rural life in America; its people, social organization, culture patterns, and problems. (Hoffsommer, Hirzel, Henkel)

### SOC. 14. URBAN SOCIOLOGY. (3)

Second semester. Urban growth and expansion; characteristics of city populations; urban institutional and personality patterns; relations of city and country. (Cussler, Gordon)

### SOC. 51. SOCIAL PATHOLOGY. (3)

First semester. Prerequisite, sophomore standing. Personal-social disorganization and maladjustment; physical and mental handicaps; economic inadequacies; programs of treatment and control. (Shankweiler, Franz, Di Bella)

### SOC. 52. CRIMINOLOGY. (3)

Second semester. Prerequisite, sophomore standing. Criminal behavior and the methods of its study; causation; typologies of criminal acts and offenders; punishment, correction, and incapacitation; prevention of crime. (Lejins, Pownall, Toland)

### SOC. 62. SOCIAL INSTITUTIONS. (3)

Second semester. Prerequisite, sophomore standing. Nature and function of social institutions; the perpetuation of behavior through customs and social norms; typical contemporary American institutions. (Price)

### SOC. 64. COURTSHIP AND MARRIAGE. (3)

Prerequisite, sophomore standing. A sociological study of courtship and marriage including consideration of physiological and psychological factors. Inter-cultural companions and practical consideration. Designed for students in the lower division. (Shankweiler, Motz, Harper)

### SOC. 71. DYNAMICS OF SOCIAL INTERACTION. (3)

Prerequisite, Soc. 1 or equivalent. Social psychology of groups like committees, teams, clubs, sects, social movements, crowds and publics. Origin of the social self; role behavior, inter-group and intra-group relations. (Cussler, Staff)

### SOC. 95. INTRODUCTORY STATISTICS FOR SOCIOLOGY. (3)

(Two lectures and two hours drill per week.) Prerequisite, Math. 10 or equivalent. Elementary descriptive and inferential statistics. Measures of central tendency and variation, non-parametric and parametric measures of association and correlation, one-way analysis of variance, hypothesis testing, point and interval estimates. Required of all Sociology majors. (Henkel, Jones, Staff)

### *For Advanced Undergraduates and Graduates*

### SOC. 102. INTERCULTURAL SOCIOLOGY. (3)

First semester. Prerequisite, Soc. 2. On the basis of a comparative study of customs, individual and group behavior patterns and institutions, this course studies the ideologies of America and other modern societies. (Staff)

**SOC. 111. SOCIOLOGY OF OCCUPATIONS AND CAREERS. (3)**

First semester. The sociology of work and occupational life in modern society. Changing occupational ideologies, values and choices. Occupational status systems and occupational mobility. The social psychology of career success.

(Coates, Jones)

**SOC. 112. RURAL-URBAN RELATIONS. (3)**

First semester. The ecology of population and the forces making for change in rural and urban life; migration, decentralization and regionalism as methods of studying individual and national issues. Applied field problems.

(Cussler, Jones)

**SOC. 113. THE RURAL COMMUNITY. (3)**

Second semester. A detailed study of rural life with emphasis on levels of living, the family, school, and church and organizational activities in the fields of health, recreation, welfare, and planning.

(Hoffsommer, Hirzel, Henkel)

**SOC. 114. THE CITY. (3)**

First semester. The rise of urban civilization and metropolitan regions; ecological process and structure; the city as a center of dominance; social problems, control and planning.

(Cussler, Hirzel)

**SOC. 115. INDUSTRIAL SOCIOLOGY. (3)**

The sociology of human relations in American industry and business. Complex industrial and business organization as social systems. Social relationship within and between industry, business, community, and society.

(Coates, Jones)

**SOC. 116. MILITARY SOCIOLOGY. (3)**

Social change and the growth of military institutions. Complex formal military organizations. Military organizations as social systems. Military service as an occupation or profession. The sociology of military life. Relations between military institutions, civilian communities and society.

(Coates)

**SOC. 118. COMMUNITY ORGANIZATION. (3)**

First semester. Community organization and its relation to social welfare; analysis of community needs and resources; health, housing, recreation; community centers; neighborhood projects.

(Di Bella)

**SOC. 121. POPULATION. (3)**

First semester. Population distribution and growth in the United States and the world; population characteristics of the United States; resulting population problems and policies.

(Hirzel)

**SOC. 122. POPULATION. (3)**

Second semester. Trends in fertility and mortality, migrations, population estimates and the resulting problems and policies.

(Hirzel)

**SOC. 123. ETHNIC MINORITIES. (3)**

First semester. Basic social processes in the relations of ethnic groups within the State; immigration groups and the Negro in the United States; ethnic minorities in Europe.

(Lejins)

## SOCIOLOGY

### SOC. 131. INTRODUCTION TO SOCIAL SERVICE. (3)

First and second semesters. General survey of the field of social-welfare activities; historical development; growth, functions, and specialization of agencies and services, private and public. (Di Bella)

### SOC. 136. SOCIOLOGY OF RELIGION. (3)

First semester. Varieties and sources of religious experience. Religious institutions and the role of religion in social life. (Anderson)

### SOC. 141. SOCIOLOGY OF PERSONALITY. (3)

First semester. Development of human nature and personality in contemporary social life; processes of socialization; attitudes, individual differences, and social behavior. (Motz, Cussler)

### SOC. 144. COLLECTIVE BEHAVIOR. (3)

Second semester. Social interaction in mass behavior; communication processes; structure and functioning of crowds, strikes, audiences, mass movements, and the public. (Cussler)

### SOC. 145. SOCIAL CONTROL. (3)

First semester. Forms, mechanisms, and techniques of group influence on human behavior; problems of social control in contemporary society. (Motz)

### SOC. 147. SOCIOLOGY OF LAW. (3)

First semester. Law as a form of social control; interrelation between legal and other conduct norms as to their content, sanctions, and methods of securing conformity; law as an integral part of the culture of the groups; factors and processes operative in the formation of legal norms as determinants of human behavior. (Lejins)

### SOC. 153. JUVENILE DELINQUENCY. (3)

First semester. Juvenile delinquency in relation to the general problem of crime; analysis of factors underlying juvenile delinquency; treatment and prevention. (Lejins)

### SOC. 154. CRIME AND DELINQUENCY PREVENTION. (3)

Second semester. Prerequisite, Soc. 52 or Soc. 153 or consent of instructor. Methods and programs in prevention of crime and delinquency. (Lejins)

### SOC. 155. TREATMENT OF CRIMINALS AND DELINQUENTS IN THE COMMUNITY. (3)

Prerequisite, Soc. 52, 153, or consent of instructor. Analysis of the processes and methods in the modification of criminal patterns of behavior in a community setting. (Lejins, Pownall)

### SOC. 156. INSTITUTIONAL TREATMENT OF CRIMINALS AND DELINQUENTS. (3)

First semester. Prerequisite, Soc. 52 or Soc. 153 or consent of instructor. History, organization and functions of penal and correctional institutions for adults and juveniles. (Lejins, Pownall)

### SOC. 161. THE SOCIOLOGY OF WAR. (3)

Second semester. The origin and development of armed forces as institutions; the social causes, operations and results of war as social conflict; the relations of peace and war and revolution in contemporary civilization. (Coates)

**SOC. 164. THE FAMILY AND SOCIETY. (3)**

Study of the family as a social institution; its biological and cultural foundations, historic development, changing structure and function; the interactions of marriages and parenthood, disorganizing and reorganizing factors in present day trends.  
(Shankweiler, Harper, Motz)

**SOC. 166. INTERVIEWING AND PROBLEM SOLVING IN SOCIAL WORK. (3)**

Prerequisite, Soc. 131 (may be taken concurrently). The principles of interviewing and other diagnostic techniques as applied to social problems with particular reference to family and child behavior.  
(Di Bella)

**SOC. 171. FAMILY AND CHILD WELFARE. (3)**

First semester. Programs of family and child welfare agencies; social services to families and children; child placement; foster families.  
(Di Bella)

**SOC. 173. SOCIAL SECURITY. (3)**

First semester. The social security program in the United States; public assistance; social insurance.  
(Di Bella)

**SOC. 174. PUBLIC WELFARE. (3)**

Second semester. Development and organization of the public welfare movement in the United States, social legislation, interrelations of federal, state, and local agencies and institutions.  
(Di Bella)

**SOC. 180. SMALL GROUP ANALYSIS. (3)**

Analysis of small group structure and dynamics. Review of research on small groups in factories, military service, schools and communities. Presentation of techniques used in the study of small groups.  
(Franz)

**SOC. 186. SOCIOLOGICAL THEORY. (3)**

Development of the science of sociology; historical backgrounds; recent theories of society. Majors in sociology should take this course in their senior year.  
(Janes, Motz, Hirzel)

**SOC. 191. SOCIAL FIELD TRAINING. (1-3)**

Prerequisites, for social work field training, Soc. 131; for crime control field training, Soc. 52 and 153. Enrollment restricted to available placements. Supervised field training in public and private social agencies. The student will select his particular area of interest and be responsible to an agency for a definite program of in-service training. Group meetings, individual conferences, and written program reports will be a required part of the course.  
(Staff)

**SOC. 195. INTERMEDIATE STATISTICS FOR SOCIOLOGISTS. (3)**

Prerequisite, Soc. 95 or equivalent and six additional credits in Sociology. Intermediate correlation techniques, analysis of variance, sampling, additional non-parametric techniques, additional topics in inferential statistics. Required of all candidates for the M.A. degree.  
(Henkel, Staff)

**SOC. 196. SENIOR SEMINAR. (3)**

Required of and open only to senior majors in sociology. Scope, fields, and research methods of sociology; practical applications of sociological knowledge. Individual study and reports. Sociology majors who expect to graduate in mid-year should take this course in the preceding spring semester.  
(Hoffsommer, Cussler)

## SOCIOLOGY

### *For Graduates*

With the exception of Soc. 201, 285, 290, and 291, individual courses numbered 200 to 299 will ordinarily be offered in alternate years.

#### SOC. 201. METHODS OF SOCIAL RESEARCH. (3)

First semester. Selection and formulation of research projects; methods and techniques of sociological investigation and analysis. Required of graduate majors in sociology. (Hoffsommer)

#### SOC. 214. SURVEY OF URBAN THEORY. (3)

Prerequisite, Soc. 14 or 114 or equivalent. Theoretical approaches of Sociology and other social sciences to urbanism, urbanization, and urban phenomena. Selected approaches: Chicago School; metropolitan region; demography, institutions. (Janes, Hirzel, Staff)

#### SOC. 215. COMMUNITY STUDIES. (3)

First semester. Intensive study of the factors affecting community development and growth, social structure, social stratification, social mobility and social situations; analysis of particular communities. (Staff)

#### SOC. 216. SOCIOLOGY OF OCCUPATIONS AND PROFESSIONS. (3)

Second semester. An analysis of the occupational and professional structure of American society, with special emphasis on changing roles, functions, ideologies and community-relationships. (Coates)

#### SOC. 217. SEMINAR IN FIELD WORK URBAN RESEARCH. (3)

Prerequisite, Soc. 214. Methods of research in Sociology applied to the urban and metropolitan community, reviews of needed research, reviews of contemporary research; the design and execution of field studies. (Hirzel, Staff)

#### SOC. 221. POPULATION AND SOCIETY. (3)

Second semester. Selected problems in the field of population; quantitative and qualitative aspects; American and world problems. (Hirzel)

#### SOC. 230. COMPARATIVE SOCIOLOGY. (3)

Second semester. Comparison of the social institutions, organizations, patterns of collective behavior, and art manifestations of social values countries. (Staff)

#### SOC. 241. PERSONALITY AND SOCIAL STRUCTURE. (3)

First semester. Comparative analysis of the development of human nature, personality, and social traits in select social structures. (Cussler)

#### SOC. 246. PUBLIC OPINION AND PROPAGANDA. (3)

Second semester. Processes involved in the formation of mass attitudes; agencies and techniques of communication; quantitative measurement of public opinion. (Motz)

#### SOC. 250. FORMAL ORGANIZATION. (3)

An introduction to the study of organizations, the nature of organizations, types of organizations, determinants and consequences of organizational growth, determinants and consequences of growth for administrative staff, determinants of effectiveness and research in organizations. (Price)

**SOC. 253. ADVANCED CRIMINOLOGY. (3)**

First semester. Survey of the principal issues in contemporary criminological theory and research. (Lejins)

**SOC. 254. SEMINAR: CRIMINOLOGY. (3)**

Second semester. Selected problems in criminology. (Lejins)

**SOC. 255. SEMINAR: JUVENILE DELINQUENCY. (3)**

First semester. Selected problems in the field of juvenile delinquency. (Lejins)

**SOC. 256. CRIME AND DELINQUENCY AS A COMMUNITY PROBLEM. (3)**

Second semester. An intensive study of selected problems in adult crime and juvenile delinquency in Maryland. (Lejins)

**SOC. 257. SOCIAL CHANGE AND SOCIAL POLICY. (3)**

First semester. Emergence and development of social policy as related to social change; policy-making factors in social welfare and social legislation. (Price)

**SOC. 262. FAMILY STUDIES. (3)**

Second semester. Case studies of family situations; statistical studies of family trends, methods of investigation and analysis. (Shankweiler)

**SOC. 263. MARRIAGE AND FAMILY COUNSELING. (3)**

Second semester. Prerequisite, Soc. 64 or 164 or consent of instructor. A sociological analysis of an emerging, family-centered profession. Designed for advanced sociology majors or allied fields, for use in vocations such as teaching, medicine, the ministry and others embodying the role of guidance. (Shankweiler)

**SOC. 264. THE SOCIOLOGY OF MENTAL HEALTH. (3)**

First semester. A study of the sociological factors that condition mental health together with an appraisal of the group dynamics of its preservation. (Staff)

**SOC. 271. THEORY OF SOCIAL INTERACTION. (3)**

Second semester. Positions of major sociologists and social psychologists as to how the individual interacts with various groups and the issues involved. Trends in recent interaction theory. (Cussler)

**SOC. 282. SOCIOLOGY METHODOLOGY. (3)**

Second semester. Logic and method of sociology in relation to the general theory of scientific method; principal issues and points of view. (Henkel)

**SOC. 286. DEVELOPMENT OF EUROPEAN AND AMERICAN SOCIOLOGICAL THEORY. (3)**

Prerequisite, Soc. 186 or equivalent. Review of systematic sociological theories (such as Positivism, Organicism, Conflict, etc.) from the early 19th Century to the present. A review of the emerging self-evaluation of Sociology. (Staff)

**SOC. 287. SEMINAR: SOCIOLOGICAL THEORY. (3)**

Prerequisite, Soc. 186 or equivalent. Systematic examination of contemporary sociological theories such as structural functionalism and social action. Special reference is given to the relevance of each theory to the conduct of sociological investigation. (Janes)

## ANTHROPOLOGY

- SOC. 291. SPECIAL SOCIAL PROBLEMS. (Credit to be determined)  
Individual research on selected problems. (Staff)
- SOC. 295. ADVANCED STATISTICS FOR SOCIOLOGISTS. (3)  
Prerequisite, Soc. 195 or equivalent. Advanced treatment of inferential statistics, sampling, research design, non-parametric techniques, scaling. Required of all candidates for the Ph.D. degree. (Henkel, Staff)
- SOC. 399. THESIS RESEARCH. (Credit to be determined)  
(Thesis Adviser)

## ANTHROPOLOGY

Courses in Anthropology may be regarded as constituting an independent minor in some programs leading to the B.A. degree or may, at the discretion of the Department of Sociology, be counted toward the major in Sociology.

Anthropology 1 or its equivalent is prerequisite to all other courses in Anthropology.

### ANTH. 1. INTRODUCTION TO ANTHROPOLOGY: ARCHEOLOGY AND PHYSICAL ANTHROPOLOGY. (3)

May be taken for credit in the General Education Program. General patterns of the development of human culture; the biological and morphological aspects of man viewed in his cultural setting. (Anderson, Williams, and Staff)

### ANTH. 2. INTRODUCTION TO ANTHROPOLOGY: CULTURAL ANTHROPOLOGY AND LINGUISTICS. (3)

Social and cultural principles as exemplified in ethnographic descriptions. The study of language within the context of Anthropology. (Anderson, Williams, and Staff)

### *For Advanced Undergraduates and Graduates*

### ANTH. 105. CULTURAL ANTHROPOLOGY. (3)

A survey of the simpler cultures of the world, with attention to historical processes and the application of anthropological theory to the modern situation.

### ANTH. 106. ARCHEOLOGY. (3)

A survey of human cultural developments as revealed by archeological methods, with materials to be drawn from selected areas of both Old and New Worlds.

### ANTH. 124. THE CULTURE OF THE AMERICAN INDIAN. (3)

A study of type cultures, cultural processes, and the effects of acculturation on selected tribes of Indians in the Americas. (Anderson, Williams)

### ANTH. 125. CULTURAL HISTORY OF THE NEGRO. (3)

The cultures of Africa south of the Sahara and the cultural adjustments of the Negro in North and South America. (Anderson)

*For Graduates*

ANTH. 224. RACE AND CULTURE. (3)

Prerequisite, permission of the instructor. Race and culture in contemporary society; mobility and the social effects of race and culture contacts and intermixture. (Anderson)

## SPEECH AND DRAMATIC ART

*Professor and Head:* STRAUSBAUGH.

*Professor:* HENDRICKS.

*Associate Professors:* AYLWARD, BATKA, LINKOW, NIEMEYER, PUGLIESE AND WEAVER.

*Associate Research Professor:* CAUSEY.

*Assistant Professors:* BAKER, CRAVEN, DOUDNA, FRANK, MEERSMAN, PROVENSEN, SCHMITT, STARCHER AND WOLFE.

*Instructors:* CARTER, FITZGERALD, FUSSELL, GOSSAGE, KANSTOROOM, MCCAIN, MENSER, NAVRATIL AND SCHLESINGER.

*Lecturers:* HEDLUND AND SPEUHLER.

The courses in this Department have two main functions: (1) to provide training in basic oral communication skills to meet the general needs of undergraduates of the University; (2) to provide integrated specialized training for students who wish to major or minor in speech.

A major may be taken in the Speech Department in one of two general areas, the speech arts or the speech sciences. The speech arts include theater, radio and television, public speaking, and oral interpretation; the speech sciences include phonetics, semantics, speech pathology, and audiology. The undergraduate program provides a level of training that will prepare students to enter several professional fields. Specifically, these fields are: (1) teaching speech and dramatic art or directing these activities; (2) radio and television; (3) speech and hearing science. In addition, adequate preparation and training for graduate work is provided. Programs for various concentrations may be obtained from the departmental office or advisers.

Minors in speech are adapted to meet the needs of students majoring in English, the social sciences, journalism and public relations, elementary education, nursery school-kindergarten education, pre-law, and pre-ministry fields.

Prerequisites for all majors in speech are Speech 1, 2, 3, or 4, and Zool. 1. Major requirements: 30 hours of courses in speech with 15 hours of

## **SPEECH AND DRAMATIC ART**

courses numbered 100 and above, in either the speech arts or speech sciences. No course with a grade less than "C" may be used to satisfy major requirements.

Specific requirements for professional training in speech and hearing therapy include completion of the general requirements for speech majors with the following additions: Zool. 14, 15; Psych. 1, 5, 131; a minimum of 21 hours of speech sciences at the 100 level.

The Department offers an Honors Program. Information may be obtained from the departmental advisers.

Qualified students, depending upon specialized interests, are invited to participate in the activities of the University Theater, Radio-Television Workshop, and the Calvert Debate Club.

### **\*SPEECH 1. PUBLIC SPEAKING. (3)**

Prerequisite for advanced speech courses. Laboratory fee, \$1.00. The preparation and delivery of short original speeches; outside readings; reports, etc. It is recommended that this course be taken during the freshman year. Speech 1 and Speech 7 may not both be used for credit. (Linkow, Staff)

### **SPEECH 2. ADVANCED PUBLIC SPEAKING. (3)**

Prerequisite, Speech 1 or 7. A study of rhetorical principles and models of speech composition in conjunction with the preparation and presentation of specific forms of public address. (McCain, Staff)

### **SPEECH CLINIC. NO CREDIT.**

Remedial work in minor speech defects. The work of the clinic is conducted in individual conferences and in small group meetings. Hours arranged by consultation with the respective speech instructor. (Staff)

### **SPEECH 3. FUNDAMENTALS OF GENERAL AMERICAN SPEECH. (3)**

Training in auditory discrimination of speech sounds, rhythms and inflections of general American speech. Analysis of the physiological bases of speech production and the phonetic elements of speech reception. This course is required of majors in speech and hearing science and recommended for foreign students and majors in nursery and elementary education. (Hendricks, Staff)

### **SPEECH 4. VOICE AND DICTION. (3)**

First and second semesters. Emphasis upon the improvement of voice, articulation, and phonation. May be taken concurrently with Speech 1. (Starcher, Staff)

### **\*SPEECH 7. PUBLIC SPEAKING. (2)**

Laboratory fee, \$1.00. The preparation and delivery of speeches on technical and general subjects. Speech 7 and Speech 1 may not both be used for credit. (Strausbaugh, Staff)

### **SPEECH 8. ACTING. (3)**

Prerequisite, consent of instructor. Basic principles of histrionic practice. (Meersman)

---

\* Speech 3 should be substituted for non-English speaking students.

**SPEECH 10. GROUP DISCUSSION. (2)**

A study of the principles, methods, and types of discussion, and their application in the discussion of contemporary problems. (Linkow, Staff)

**SPEECH 11, 12. DEBATE. (2, 2)**

Pre-Law students may take Speech 11, 12, instead of Speech 1 or Speech 7. A study of the principles of argument, analysis, evidence, reasoning, fallacies, briefing, and delivery, together with their application in public speaking (Fitzgerald)

**SPEECH 13. ORAL INTERPRETATION. (3)**

The oral interpretation of literature and the practical training of students in the art of reading. (Provensen)

**SPEECH 14. STAGECRAFT. (3)**

Laboratory fee, \$2.00. Fundamentals of technical production. Emphasis on construction of scenery. (Gossage)

**SPEECH 16. INTRODUCTION TO THE THEATRE. (3)**

A general survey of the fields of the theatre. (Pugliese)

**SPEECH 17. MAKE-UP. (2)**

First semester. One lecture and one laboratory period a week. Laboratory fee, \$2.00. A lecture-laboratory course in the theory and practice of stage make-up, covering basic requirements as to age, type, character, race, and period. (Schmitt)

**SPEECH 21. FUNDAMENTALS OF SPEECH COMMUNICATION. (3)**

First and second semesters. A study of oral communicative behavior, including problems and processes of symbolizations, aspects of oral language, the involvement of the talker and listener, kinds of signals, and self-revelation through speech. (McCain)

**SPEECH 22. INTRODUCTION TO RADIO AND TELEVISION. (3)**

Prerequisite for all courses in radio. The development, scope, and influence of American broadcasting and telecasting, including visits to local radio and television stations, with guest lecturers from Radio Station WTOP and television stations. (Batka)

**SPEECH 23. PARLIAMENTARY LAW. (1)**

A study of the principles and application of parliamentary law as applied to all types of meetings. Thorough training in the use of Robert's Rules of Order. (Strausbaugh)

*For Advanced Undergraduates and Graduates*

**SPEECH 102. RADIO PRODUCTION. (3)**

Second semester. Prerequisites, Speech 22 and consent of instructor. Laboratory fee, \$2.00. A study of the multiple problems facing the producer. Special emphasis is given to acoustic setup, casting, "miking," timing, cutting and the coordination of personnel factors involved in the production of radio programs. (Schlesinger)

## SPEECH AND DRAMATIC ART

### SPEECH 105. SPEECH-HANDICAPPED SCHOOL CHILDREN. (3)

Prerequisite, Speech 3 for undergraduates. The occurrence, identification and treatment of speech handicaps in the classrooms. An introduction to speech pathology. (Craven)

### SPEECH 106. CLINICAL PRACTICE. (1 to 5 Credits, up to 9)

Summer session. Prerequisite, Speech 105. May be taken for 1-5 credit hours per semester. May be repeated for a total of 9 semester hours credit. Laboratory fee, \$1.00 per hour. Clinical practice in various methods of corrective procedures with various types of speech cases in the University clinic, Veterans hospitals, and public schools. (Craven)

### SPEECH 107. ADVANCED ORAL INTERPRETATION. (3)

Second semester. Prerequisite, Speech 13. Emphasis upon the longer reading. Program planning. (Provensen)

### SPEECH 108. EDUCATIONAL PHONETICS. (3)

This course is designed to relate phonetic science to the classroom. An extensive coverage of broad transcription of General American speech. Students having credit for Speech 3 or any previous phonetics course are not eligible for this course. (Hendricks)

### SPEECH 109. SPEECH AND LANGUAGE DEVELOPMENT OF CHILDREN. (3)

Second semester. Admission by consent of instructor. An analysis of normal and abnormal processes of speech and language development in children. (Hendricks)

### SPEECH 110. ADVANCED GROUP DISCUSSION. (3)

Prerequisite, Speech 10. Required in speech curriculum and elective in other curricula. An examination of current research and techniques in the discussion and conference, including extensive practice in this area. (Linkow)

### SPEECH 111. SEMINAR. (3)

Prerequisites, senior standing and consent of instructor. Present-day speech research. (Strausbaugh, Staff)

### SPEECH 112. PHONETICS. (3)

First semester. Prerequisite, Speech 3 or consent of instructor. Laboratory fee, \$3.00. Training in the recognition and production of the sounds of spoken English, with an analysis of their formation. Practice transcription. Mastery of the international phonetic alphabet. (Baker)

### SPEECH 113. PLAY PRODUCTION. (3)

Second semester. Prerequisite, Speech 16 or consent of instructor. Development of procedure followed by the director in preparing plays for public performance. (Meersman)

### SPEECH 114. THE FILM AS AN ART FORM. (3)

Laboratory fee, \$10.00. A study of the motion picture as a developing form of entertainment, communication, and artistic expression. A series of significant American and foreign films are viewed to illustrate the artistic, historical and sociological trends of the twentieth century. (Niemeyer)

**SPEECH 115. RADIO AND TELEVISION IN RETAILING. (3)**

First semester. Limited to students in the College of Home Economics. Prerequisite, Speech 1 or 7. Laboratory fee, \$2.00. Writing and production of promotional programs for the merchandising of wearing apparel and home-furnishings. Collaboration with the Washington and Baltimore radio stations and retail stores. (Schlesinger)

**SPEECH 116. RADIO AND TELEVISION ANNOUNCING. (3)**

First semester. Prerequisites, Speech 4 and 22 or consent of instructor. Laboratory fee, \$2.00. The theory and application of all types of announcing. (Batka)

**SPEECH 117. RADIO AND TELEVISION CONTINUITY WRITING. (3)**

Second semester. Prerequisite, Speech 22 or consent of instructor. A study of the principles, methods and limitations of writing for radio and television. Application will be made in the writing of general types of continuities and commercials. (Schlesinger)

**SPEECH 120. SPEECH PATHOLOGY. (3)**

First semester. Prerequisite, Speech 105. Laboratory fee, \$3.00. A continuation of Speech 105, with emphasis on the causes and treatment of organic speech disorders. (Carter)

**SPEECH 124, 125. AMERICAN PUBLIC ADDRESS. (3, 3)**

Prerequisite, Speech 1 or 7. The first semester covers the period from colonial times to the Civil War period. The second semester covers from the Civil War period through the contemporary period. (Staff)

**SPEECH 126. SEMANTIC ASPECTS OF SPEECH IN HUMAN RELATIONS. (3)**

Second semester. Prerequisite, one course in public speaking. An analysis of speech and language habits from the standpoint of general semantics. (Hendricks)

**SPEECH 127. CHILDREN'S DRAMATICS. (3)**

Principles and methods necessary for staging children's productions on the elementary school level. Major emphasis on creative dramatics; the application of creative dramatics in the school room, and the values gained by the child in this activity. Students will conduct classes in formal and creative dramatics which will culminate in children's programs. (Pugliese)

**SPEECH 129, 130. PLAY DIRECTING. (3, 3)**

Prerequisite, Speech 8 or consent of instructor. A lecture-laboratory course dealing with the fundamentals of script cutting, pacing, movement, blocking, and rehearsal routine as applied to the directing of plays. (Pugliese, Meersman)

**SPEECH 131. HISTORY OF THE THEATRE. (3)**

First semester. A survey of the dramatic production from early origin to 1800. (Niemeyer)

**SPEECH 132. HISTORY OF THE THEATRE. (3)**

Second semester. A survey of dramatic production from 1800 to the present. (Niemeyer)

## **SPEECH AND DRAMATIC ART**

### **SPEECH 133. COMMUNICATION PROCESSES IN CONFERENCES. (3)**

Second semester. Prerequisite, one course in public speaking. Limited to students at the off-campus centers. Group participation in conferences, methods of problem solving, semantic aspects of language and the function of conferences in industry and government. (Linkow)

### **SPEECH 135. INSTRUMENTATION IN SPEECH AND HEARING SCIENCE. (2)**

First semester. Prerequisite, Speech 3. Laboratory fee, \$2.00. The use of electronic equipment in the measurement of speech and hearing. (Linkow)

### **SPEECH 136. PRINCIPLES OF SPEECH THERAPY. (3)**

Prerequisite, Speech 120. Laboratory fee, \$3.00. Differential diagnosis of speech and language handicaps and the application of psychological principles of learning, motivation and adjustment in the treatment of speech disorders. (Craven)

### **SPEECH 138. METHODS AND MATERIALS IN SPEECH CORRECTION. (3)**

Prerequisite, Speech 120 or the equivalent. Laboratory fee, \$3.00. The design and use of methods and materials for diagnosis, measurement, and retraining of the speech-handicapped. (Craven)

### **SPEECH 139. THEATRE WORKSHOP. (3)**

Prerequisite, Speech 8 or 14. A laboratory course designed to provide the student with practical experience in all phases of theatre production. (Strausbaugh)

### **SPEECH 140. PRINCIPLES OF TELEVISION PRODUCTION. (3)**

Prerequisite, Speech 22. Laboratory fee, \$5.00. A study of the theory, methods, techniques, and problems of television production and direction. Units of study covering television cameras and lenses, lighting theory and practices, scenery and properties, costumes and makeup, graphic arts and special effects are included. Observation of production procedures at nearby television stations. Application will be made through crew assignments for University-produced television programs. (Aylward, Wolfe)

### **SPEECH 141. INTRODUCTION TO AUDIOMETRY. (2)**

First semester. Prerequisite, Speech 3. Laboratory fee, \$2.00. Analysis of various methods and procedures in evaluating hearing losses. Required for students whose concentration is in speech and hearing therapy. (Doudna)

### **SPEECH 142. SPEECH READING AND AUDITORY TRAINING. (2)**

Second semester. Prerequisite, Speech 3. Laboratory fee, \$2.00. Methods of training individuals with hearing loss to recognize, interpret and understand spoken language. Required for students whose concentration is in speech and hearing therapy. (Doudna)

### **SPEECH 146. TELEVISION NEWS AND PUBLIC AFFAIRS. (3)**

First semester. Prerequisite, Speech 117 or Journalism 101. Training in presentation of television news, interviews, discussions, and forums. (Schlesinger)

**SPEECH 147. ANALYSIS OF BROADCASTING PROCESSES AND RESULTS. (2)**

First semester. Prerequisite, Speech 22 or consent of instructor. Survey of the more common analytic approaches, methods, and results in the field of radio and television. (Aylward)

**SPEECH 148. TELEVISION DIRECTION. (3)**

Second semester. Two hour lecture, three hour laboratory. Prerequisites, Speech 22, 140. Laboratory fee, \$10.00. Principles of television direction including analysis of script, casting, rehearsing, production, and video control. (Aylward)

**SPEECH 149. TELEVISION WORKSHOP. (3)**

Second semester. Two hour lecture, four hour laboratory. Prerequisites, Speech 22, 140 and 148, or consent of instructor. Laboratory fee, \$10.00. (Aylward)

**SPEECH 150. RADIO AND TELEVISION STATION MANAGEMENT. (2)**

Second semester. Prerequisite, Speech 22 or consent of instructor. Broadcasting regulations, licenses, personnel functions, sales, advertising, and program and station promotion. (Batka)

**SPEECH 161. ANCIENT RHETORIC. (3)**

Second semester. Prerequisite, Speech 2 or 11. The theories of speechmaking and speech composition as propounded by the classical rhetoricians. Special attention is given to Plato, Aristotle, Socrates, Cicero, Quintillian and St. Augustine. (McCain)

**SPEECH 163. MATERIALS AND PROGRAMS FOR THE DEVELOPMENT OF LISTENING. (3)**

Second semester. The study of research findings, listening tests, materials, equipment, and programs which can be used to develop listening skills. (Frank)

**SPEECH 164. PERSUASION IN SPEECH. (3)**

Second semester. Prerequisite, Speech 2 or 11. A study of the bases of persuasion with emphasis on recent experimental developments in persuasion. (Weaver)

**SPEECH 171. STYLES AND THEORIES OF ACTING. (3)**

Second semester. Prerequisite, Speech 8 or consent of instructor. The study and application of historical styles and theories of acting. (Pugliese)

**SPEECH 175. STAGE DESIGN AND LIGHTING. (3)**

Second semester. Prerequisite, Speech 14 or consent of instructor. The theory of stage design and lighting. Making of plans and lighting plots as coordinate elements of scenic art. (Schmitt)

**SPEECH 180. HONORS SEMINAR. (3)**

For Honors students only. Readings, symposiums, visiting lecturers, discussions. (Staff)

*For Graduates*

The department maintains a reciprocal agreement with the Veterans Administration whereby clinical practice may be obtained at the Audiology and Speech Pathology Clinic, Veterans Administration Hospital, 50 Irving St., N. W., Washington, D. C.

## SPEECH AND DRAMATIC ART

- SPEECH 201. SPECIAL PROBLEMS SEMINAR. (A. THROUGH K.) (1, 3)**  
(6 hrs. applicable toward M. A. degree.) Prerequisites, 6 hours in speech pathology and consent of instructor. A. Stuttering; B. Cleft Palate; C. Delayed Speech; D. Articulation; E. Cerebral Palsy; F. Voice; G. Special Problems of the Deaf; H. Foreign Dialect; I. Speech Intelligibility; J. Neurophysiology of Hearing; K. Minor Research Problems. (Hendricks)
- SPEECH 202. TECHNIQUES OF RESEARCH IN SPEECH AND HEARING. (3)**  
First semester. Prerequisite, 12 hours in speech pathology and audiology. Analysis of research methodology including experimental techniques, statistical analysis and preparation of reports for scientific investigations in speech and hearing science. Required of candidates for Master's degree in speech and hearing therapy. (Staff)
- SPEECH 203. EXPERIMENTAL PHONETICS. (3)**  
Prerequisite, Speech 112. Laboratory fee, \$3.00. The application of experimental methods in quantitative analysis of the phonetic elements of speech. (Baker)
- SPEECH 204. APPLIED PHONETICS. (3)**  
Prerequisite, Speech 112 or equivalent. Laboratory fee, \$3.00. Application of phonetic analysis to communication systems and clinical analysis in speech and hearing. (Baker)
- SPEECH 205. DESCRIPTIVE PHONETICS. (3)**  
Prerequisite, Speech 112 or equivalent. Laboratory fee, \$3.00. Application of phonetic analysis in the transcription of dialects. (Baker)
- SPEECH 206. DIAGNOSTIC PROCEDURES IN SPEECH PATHOLOGY. (3)**  
Prerequisite, 6 hours of speech pathology. A study of diagnostic tools and methods in the analysis of various types of speech disorders. (Hendricks, Staff)
- SPEECH 207. ADVANCED PRINCIPLES OF SPEECH AND HEARING THERAPY. (3)**  
Prerequisite, Speech 136 or equivalent, and 6 hours of speech and hearing pathology. A review of learning principles as applied to the training of the speech and hearing handicapped. (Hendricks)
- SPEECH 208. QUANTITATIVE METHODS IN SPEECH AND HEARING SCIENCE. (3)**  
An analysis of current procedures used in quantifying phenomena observed in Speech and Hearing Science. A minimum of 12 hours credit in Speech and Hearing is a prerequisite for this course. (Staff)
- SPEECH 210. ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING. (3)**  
Prerequisite, 6 hours in speech pathology and audiology and consent of instructor. Laboratory fee, \$3.00. A study of anatomy and physiology of the auditory and speech mechanisms. (Carter)
- SPEECH 211. A, B, C, D. ADVANCED CLINICAL PRACTICE. (1, 3 UP TO 12)**  
(6 hours applicable toward M.A. degree.) Prerequisite, 12 hours in speech pathology and audiology. Laboratory fee, \$1.00 per hour. Supervised training in the application of clinical methods in the diagnosis and treatment of speech and hearing disorders. (Craven)

**SPEECH 212. ADVANCED SPEECH PATHOLOGY. (3)**

Prerequisites, 6 hours in speech pathology and consent of instructor. Laboratory fee, \$3.00. Etiology and therapy for organic and functional speech disorders. (Carter)

**SPEECH 214. CLINICAL AUDIOMETRY. (3)**

Prerequisites, 3 hours in audiology and consent of instructor. Laboratory fee, \$3.00. Testing of auditory acuity with pure tones and speech. (Doudna)

**SPEECH 216. COMMUNICATION SKILLS FOR THE HARD-OF-HEARING. (3)**

First semester. Prerequisites, 3 hours in audiology and consent of instructor. Speech reading, auditory training, and speech conservation problems in the rehabilitation of the hard-of-hearing. (Doudna)

**SPEECH 217. HEARING AID SELECTION FOR THE ACOUSTICALLY HANDICAPPED. (3)**

Prerequisite, Speech 214. Laboratory fee, \$3.00. A laboratory course in modern methods of utilizing electronic hearing aids. (Staff)

**SPEECH 218. SPEECH AND HEARING IN MEDICAL REHABILITATION AND SPECIAL EDUCATION PROGRAMS. (3)**

Second semester. Prerequisites, 6 hours in speech pathology and audiology and consent of instructor. Administrative problems involved in the organization and operation of speech and hearing therapy under the different types of programs. (Hendricks)

**SPEECH 219. SPEECH DISORDERS OF THE BRAIN-INJURED. (3)**

Prerequisites, 6 hours in speech pathology and audiology and consent of instructor. Laboratory fee, \$3.00. Methods of evaluation and treatment of children and adults who have suffered injury to brain tissue, with subsequent damage to speech and language processes. (Hendricks)

**SPEECH 220. EXPERIMENTAL AUDIOLOGY. (3)**

Second semester. Prerequisite, 6 hours in audiology. Laboratory fee, \$3.00. A study of experimental techniques in the investigation of problems in audiology and psychoacoustics. (Causey)

**SPEECH 221. COMMUNICATION THEORY AND SPEECH HEARING PROBLEMS. (3)**

Second semester. Prerequisite, 6 hours in speech pathology and audiology and consent of instructor. Analysis of current theories of communication as they apply to research and therapy in speech and hearing. (Hendricks)

**SPEECH 222. ADVANCED BIO-ACOUSTICS. (3)**

Prerequisite, 6 hours of audiology. Laboratory fee, \$3.00. Laboratory research methods in the study of hearing mechanisms in animals. (Spuehler)

**SPEECH 223. ADVANCED PSYCHO-ACOUSTICS. (3)**

Prerequisite, 6 hours of audiology. Laboratory fee, \$3.00. Research methodology in the study of human hearing. (Causey)

**SPEECH 224. THE PREPARATION OF SPEECH AND HEARING SCIENTISTS IN INSTITUTIONS OF HIGHER LEARNING. (3)**

Prerequisite, 6 hours of audiology and 6 hours of speech pathology. A review of problems involved in the training of personnel who expect to take teaching and research positions at university and college level. (Hendricks)

## SPEECH AND DRAMATIC ART

### SPEECH 225. ADVANCED SEMANTICS. (3)

Prerequisite, 3 hours of semantics. Laboratory fee, \$3.00. Advanced study of the effects of language in human perception. (Hendricks)

### SPEECH 226. LANGUAGE PROBLEMS OF THE EXCEPTIONAL CHILD. (3)

Prerequisite, 6 hours of speech pathology. A survey of special language problems of the mentally retarded, brain-injured, hard-of-hearing and deaf children. (Staff)

### SPEECH 227. EXPERIMENTAL DESIGN IN SPEECH AND HEARING SCIENCE. (3)

A seminar devoted to planning and conducting experiments in speech and hearing science. Each student is required to present three pilot studies for discussion. Two hours classwork, two hours laboratory. Permission of instructor required. Lab. fee of \$10.00. (Staff)

### SPEECH 240. SEMINAR IN BROADCASTING. (3)

First semester. Studies of various aspects of broadcasting. (Aylward)

### SPEECH 241. SPECIAL PROBLEMS IN BROADCASTING. (3)

Second semester. An experimental laboratory course for the development of new ideas in broadcasting. (Batka)

### SPEECH 248. ADVANCED TELEVISION DIRECTION. (3)

Second semester. Prerequisite, Speech 148 or consent of instructor. Principles of television direction as applied to dramatic programs, together with a consideration of the specific aesthetic values of the television medium. (Aylward)

### SPEECH 260. SPEECH AND DRAMA PROGRAMS IN HIGHER EDUCATION. (3)

First semester. A study of current theories and practices in speech education. (Frank)

### SPEECH 261. INTRODUCTION TO GRADUATE STUDY IN SPEECH. (3)

First semester. (Weaver)

### SPEECH 262. SPECIAL PROBLEMS IN GENERAL SPEECH. (3)

First semester. (Weaver)

### SPEECH 263. RHETORICAL THEORIES OF STYLE. (3)

Second semester. Prerequisite, Speech 124, 125, or 161, or consent of instructor. Examination of selected theories of style drawn from the fields of rhetoric and literature, and analysis of model speeches. (Staff)

### SPEECH 264. INTERPERSONAL COMMUNICATION. (3)

Second semester. Problems and processes of symbolic representation in speech, the effects of language on communication, semantic redundancy, and interaction between meaning and the structure of oral language. (Weaver)

### SPEECH 270. SEMINAR: STUDIES IN THEATRE. (3)

First semester. Research projects adapted to individual backgrounds and special work. (Meersman)

### SPEECH 271. THE THEORY OF PRE-MODERN DRAMATIC PRODUCTION. (3)

Second semester. An historical survey of production styles. (Pugliese)

**SPEECH 272. SPECIAL PROBLEMS IN DRAMA. (3)**

Second semester. The preparation of adaptations and other projects in dramaturgy. (Pugliese)

**SPEECH 273. THEORIES OF THE DRAMA. (3)**

Advanced study of the identification and development of dramatic form from the early Greek drama to contemporary forms; the esthetics of theatre arts; and dramatic criticism. (Meersman)

**SPEECH 290. INDEPENDENT STUDY. (1-3)**

Prerequisite, consent of instructor. An individual course designed for intensive study or research of problems in any one of the three areas of drama, general speech, or radio/tv. (Staff)

**SPEECH 301. INDEPENDENT STUDY IN SPEECH AND HEARING SCIENCE. (1-6)**

Student-selected topic of investigation. A proposed topic must be approved prior to registration. In addition to a formal report an oral presentation of the results will be required. May be repeated. Prerequisite, 30 hours of graduate study in speech and hearing science. (Staff)

**SPEECH 399. THESIS RESEARCH. (1-6)**

(Staff)

## ZOOLOGY

*Professor and Head:* ANASTOS.

*Professors:* BERNSTEIN, BURHOE (Emeritus), CRENSHAW, HALEY AND SCHOENBORN.

*Research Professors, Part-time:* GLINOS, HUMPHREY AND SADUN.

*Associate Professors:* BROWN, GROLLMAN, HIGHTON, JACHOWSKI, LINDER, RAMM AND STROSS.

*Associate Professors:* BRINKLEY, EISENBERG, R. FICKEN, GAINER, GOLDMAN, KELLER, NELSON, POTTER AND SCHMITTNER.

*Research Assistant Professor:* ELBL.

*Research Associates:* DOSS, FARR (P.T.), M. FICKEN (P.T.), T. KAUFMANN, MCINTOSH (P.T.), AND MORSE.

*Instructors:* ANDERSON, GLOVER, GRISMER, HUNT, T. S. KAUFMAN, LANE, MACKISON, MARSHALL, McLAUGHLIN, MOZDZEN, MYTON, RESAU AND STEWART.

All Zoology courses with laboratory have a laboratory fee of \$12.00 per course per semester.

The Department of Zoology offers a program leading to a B.S. with a major in Zoology. A core of required courses and restricted electives in zoology, as well as supporting courses in other fields, provides an introduction to,

## ZOOLOGY

and an appreciation of, the broad field of zoology. Through selection of additional elective courses to complete the required 34 credit hours in zoology, the student may explore in greater depth some phase of zoology which is of particular interest to him. Copies of suggested curricula for students interested in preparation for graduate study in various phases of zoology or in premedical, predental and biological technician training are available from the departmental office.

All majors are required to complete a minimum of 34 hours in zoology with an average grade of "C." Required courses include Zool. 1, 2, 5, 6 and one course from each of the following groups: Group I, Zool. 102, 103, 104, 105, 108, 109; Group II, Zool. 110, 118, 120, 127, 129; Group III, Zool. 106, 121, 128, 130, 182, 190.

Supporting courses must include Math. 10, 11, Introduction to Mathematics (3, 3), or Math. 19, Elementary Analysis (4); Phys. 10, 11, Fundamentals of Physics (4, 4); Chem. 1, 3, General Chemistry (4, 4); Chem. 31, 33 (6) or Chem. 35, 36, 37, 38, Organic Chemistry (8); and one of the following courses or course sequences: Math. 14, 15 (6) or Math. 20, 21, Calculus (8); Chem. 19, Quantitative Analysis (4); Bot. 2 (4); or Microb. 1 (4). It is strongly recommended that the supporting courses in chemistry and mathematics be completed as early in the curriculum as possible. Students desiring to enter graduate study in certain areas of zoology are advised to take biochemistry, physical chemistry, statistics or advanced mathematics as a part of their undergraduate training.

**HONORS:** The Department of Zoology also offers a special program for the exceptionally talented and promising student. The Honors Program emphasizes the scholarly approach to independent study rather than adherence to a rigidly prescribed curriculum. Information regarding this program may be obtained from the departmental office or from the Chairman of the Zoology Honors Program.

### *For Undergraduates*

#### **ZOOL. 1. GENERAL ZOOLOGY. (4)**

Three lectures and one two-hour laboratory period a week. Zool. 1 and 2 satisfy the freshman premedical requirement in general biology. An introduction to the modern concepts of biological principles and animal life. Emphasis will be placed upon the functional aspects of living systems with a survey of the physical and chemical bases of all life processes. (Linder, Brown)

#### **ZOOL. 2. THE ANIMAL PHYLA. (4)**

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Zool. 1 or Bot. 1. A study of the anatomy, classification and life histories of representative animals, invertebrates and vertebrates. (Highton)

#### **ZOOL. 5. COMPARATIVE VERTEBRATE MORPHOLOGY. (4)**

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, Zool. 1 and 2 or equivalent. A comparative study of the evolution of vertebrate organ systems supplemented by laboratory dissection and demonstrations. (Eisenberg)

**ZOOL. 6. GENETICS. (4)**

Second semester. Two lectures, one discussion period, and one two-hour laboratory period a week. Prerequisite, one course in zoology or botany. A consideration of the basic principles of heredity. (Crenshaw)

**ZOOL. 14. HUMAN ANATOMY AND PHYSIOLOGY. (4)**

First semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Zool. 1. For students who desire a general knowledge of human anatomy and physiology. (Grollman)

**ZOOL. 15. HUMAN ANATOMY AND PHYSIOLOGY. (4)**

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, Zool. 14. A continuation of Zool. 14. (Schoenborn)

**ZOOL. 55S. DEVELOPMENT OF THE HUMAN BODY. (2)**

Summer session. Five lectures a week. A study of the main factors affecting the growth and development of the child with special emphasis on normal development. (Staff)

**ZOOL. 75. HISTORY OF ZOOLOGY. (1)**

First semester. One lecture a week. Prerequisites, a general Grade Point Average (GPA) of 3.2 and a GPA in biological subjects of 3.5 or permission of the instructor. A course in the history of the development of Zoology involving the historical figures, experiments and ideas which contributed to modern concepts. (Linder)

**ZOOL. 76. ZOOLOGICAL LITERATURE. (1)**

Second semester. One lecture a week. Prerequisites, a general Grade Point Average (GPA) of 3.2 and a GPA in biological subjects of 3.5, or permission of the instructor. Discussion of zoological literature, its use and significance. (Staff)

**ZOOL. 77. BASIC STUDY IN ZOOLOGY. (1-4)**

Prerequisites, a general Grade Point Average (GPA) of 3.2 and a GPA in biological subjects of 3.5 or permission of the instructor. Independent study, with supporting laboratory experiments, of the basic disciplines in zoology. Repeatable up to 8 hours credit. (Staff)

*For Advanced Undergraduates and Graduates*

**ZOOL. 102. VERTEBRATE PHYSIOLOGY. (4)**

First semester. Three lectures and one three-hour laboratory period a week. Prerequisites, one year of zoology and one semester of organic chemistry. An intensive study of nerve, muscle, sensory receptors and the central nervous system. (Gainer)

**ZOOL. 103. BIOPHYSICS. (3)**

Second semester. Three lectures a week. Prerequisites, one year of biology and one year of either physics or physical chemistry, or permission of the instructor. A course designed to acquaint the student with the scope of biophysics and to provide an introduction to the analysis of cells and tissues as physical-chemical systems. (Goldman)

## ZOOLOGY

### ZOOL. 104. VERTEBRATE PHYSIOLOGY. (4)

Second semester. Three lectures and one three-hour laboratory period a week. Prerequisites, one year of zoology and one semester of organic chemistry. An intensive study of the cardiovascular, gastrointestinal, renal and respiratory systems, and an introduction to endocrinology, basal metabolism and reproductive physiology. (Grollman)

### ZOOL. 105. GENERAL ENDOCRINOLOGY. (3)

First semester. Three lectures each week. Prerequisites, one year of zoology and one semester of organic chemistry. The study of the functions and the functioning of the endocrine organs of animals, with special reference to the vertebrates. (Brinkley)

### ZOOL. 106. GENETIC SYSTEMS. (3)

Second semester. Three lectures a week. Prerequisites, a course in genetics, one year of organic chemistry and Math. 11 or equivalent. A detailed description of the interactions of the genetic system. (Keller)

### ZOOL. 108. ANIMAL HISTOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, one year of zoology. A microscopic study of tissues and organs of vertebrates with special emphasis on the mammal. Practice in elementary histotechnique will be included. (Schmittner)

### ZOOL. 109. ANIMAL CYTOLOGY. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, two years of zoology and organic chemistry, or permission of the instructor. A study of cellular structure with particular reference to the morphology and physiology of cell organelles and inclusions. (Brown)

### ZOOL. 110. GENERAL PARASITOLOGY. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, two years of zoology and one year of chemistry, or permission of the instructor. A consideration of the phenomenon of parasitism through a study of the structure, function and host relationships of parasitic organisms. (Jachowski)

### ZOOL. 118. INVERTEBRATE ZOOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, one year of zoology. An advanced course dealing with the phylogeny, morphology and embryology of the invertebrates, exclusive of insects. (Linder)

### ZOOL. 120. VERTEBRATE EMBRYOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, one year of zoology. Principles of developmental dynamics including organization, differentiation, morphogenesis, and developmental physiology. (Ramm)

### ZOOL. 121. ANIMAL ECOLOGY. (3)

Second semester. Two lectures and one three-hour laboratory period a week. Prerequisite, one year of zoology. The environment and its control of animal abundance, organization of populations, and the biology of communities will be studied. (Stross)

**ZOOL. 127. ICHTHYOLOGY. (4)**

Second semester. Two lectures and one two-hour and one three-hour laboratory period a week. Prerequisites, Zool. 1, 2 and 5 or equivalent. A course in anatomy, embryology, distribution, habits and taxonomy of marine and fresh water fish. (Nelson)

**ZOOL. 128. ZOOGEOGRAPHY. (3)**

First semester. Three lectures a week. Prerequisites, Zool. 1, 2, and 5 or equivalent. Principles governing the geographical distribution of animals, with particular emphasis on vertebrates. (Highton)

**ZOOL. 129. VERTEBRATE ZOOLOGY. (4)**

First semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, two years of zoology or permission of instructor. The identification, classification, habits and behavior of vertebrates. (Ficken)

**ZOOL. 130. HYDROBIOLOGY. (4)**

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, one year of biology or permission of instructor. Study of aquatic animals and conditions of existence in water. Selected examples are used to illustrate the influence of environment on productivity of aquatic communities. (Stross)

**ZOOL. 150. SPECIAL PROBLEMS IN ZOOLOGY. (1 OR 2)**

Prerequisites, major in zoology or biological sciences, a minimum of 3.0 cumulative average in the biological sciences, and consent of instructor. Research or integrated reading in zoology. A student may register several times and receive up to 8 semester hours of credit. (Staff)

**ZOOL. 151H. HONORS SEMINAR. (1)**

First and second semesters. One discussion period a week. Prerequisite, participation in honors program. Guided discussion of topics of current interest. Repeatable to total of 4 hours credit. (Staff)

**ZOOL. 152H. HONORS INDEPENDENT STUDY. (1-4)**

Prerequisite, participation in honors program. Study of classical material by way of guided independent study and laboratory experiments. Repeatable to a total of 12 hours credit. (Staff)

**ZOOL. 153H. HONORS RESEARCH. (1-2)**

Prerequisite, participation in honors program. A laboratory research problem which is required each semester during honors participation and culminates in an honors thesis. Repeatable to a total of 8 hours credit. (Staff)

**ZOOL. 182. ETHOLOGY. (4)**

Second semester. Two lectures and two two-hour laboratory periods a week. Prerequisite, two years of zoology, including a course in comparative anatomy, or permission of instructor. The function, causation, and evolution of behavior. Laboratory analysis of the behavior of several species. (Ficken)

**ZOOL. 190. EVOLUTION. (3)**

First semester. Three lectures a week. Prerequisite, a course in genetics or permission of instructor. A consideration of current thought in regard to the origin and evolution of living organisms. (Crenshaw)

## ZOOLOGY

### *For Graduates*

#### ZOOL. 201. COMPARATIVE PHYSIOLOGY. (4)

Second semester. Three lectures and one three-hour laboratory period a week. Prerequisites, one year of zoology, one year of organic chemistry and one semester of physiology. The study of the differences and similarities in the functioning of organs of species of the animal kingdom. (Brinkley)

#### ZOOL. 203. ADVANCED EMBRYOLOGY. (4)

First semester. Two lectures and four hours of laboratory a week. Prerequisites, a course in embryology and a course in physiology. The biochemical basis of development. (Ramm)

#### ZOOL. 204. CELLULAR PHYSIOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, a course in physiology and one year of organic chemistry. The principles of general and cellular physiology as found in animal life. (Schoenborn)

#### ZOOL. 205. COMPARATIVE INVERTEBRATE ENDOCRINOLOGY. (3)

Second semester. Three lectures a week. Prerequisites, one year of organic chemistry, a course in endocrinology and a course in physiology, or permission of the instructor. A systematic approach to the structure and physiology of neuro-endocrine systems of invertebrates. (Linder)

#### ZOOL. 206. ELECTROPHYSIOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, a course in physiology, one year of physics, and permission of the instructor. A course concerned with electrical phenomena occurring in living matter and with the effect of electrical currents on cells, with special emphasis on nerves and muscles. (Gainer)

#### ZOOL. 207. ZOOLOGY SEMINAR. (Arranged)

One seminar a week for each credit hour. 1. cytology; 2. embryology; 3. fisheries; 4. genetics; 5. parasitology; 6. physiology; 7. systematics; 8. ecology; 9. behavior; 10. recent advances; and 11. endocrinology. (Staff)

#### ZOOL. 208. SPECIAL PROBLEMS IN ZOOLOGY. (Arranged)

1. cytology; 2. embryology; 3. fisheries; 4. genetics; 5. parasitology; 6. physiology; 7. systematics; 8. ecology; 9. behavior; 10. general; and 11. endocrinology. (Staff)

#### ZOOL. 210. SYSTEMATIC ZOOLOGY. (4)

First semester. Three lectures and one three-hour laboratory period a week. The principles and methods involved in the classification of animals, with emphasis on population dynamics and speciation. Methods of evaluating taxonomic data, principles of zoological nomenclature, field and museum techniques, and the factors influencing the distribution of animals are also stressed. (Highton)

#### ZOOL. 211, 212. LECTURES IN ZOOLOGY. (1-3, 1-3)

One, two, or three lectures a week. Advanced lectures by outstanding authorities in their particular field of zoology. As the subject matter is continually changing, a student may register several times, receiving credit for several semesters. (Visiting Lecturers)

**ZOOL. 215. SOCIOBIOLOGY. (4)**

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, a course in behavior and permission of the instructor. The course will deal with the description and analysis of animal social organizations, the adaptive nature of animal societies, the effects of early experience, and the role of communication in the integration of animal groups. (Eisenberg)

**ZOOL. 216. PHYSIOLOGICAL CYTOLOGY. (4)**

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, one year of biochemistry and physics, a course in physiology, or permission of the instructor. A study of the structure and function of cells by chemical, physical and microscopic methods. (Brown)

**ZOOL. 220. POPULATION GENETICS. (4)**

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, a course in genetics. The role of mutation, selection, migration, inbreeding, and stochastic process in evolution. (Highton)

**ZOOL. 223. ANALYSIS OF ANIMAL STRUCTURE. (4)**

First semester. Two lectures and four hours of laboratory a week. Prerequisite, a course in embryology. The experimental basis of developmental mechanics. (Ramm)

**ZOOL. 234. EXPERIMENTAL MAMMALIAN PHYSIOLOGY. (4)**

First semester. Two four-hour laboratory periods a week. Prerequisites, a course in physiology and one year of chemistry above general chemistry. The theory, use and application to research of instrumentation normally found in the physiology laboratory with an introduction to surgical techniques on both large and small animals. (Grollman)

**ZOOL. 235. COMPARATIVE BEHAVIOR. (4)**

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, usually a course in behavior and one in physiology, and permission of the instructor. Orientation and migration, communication, coding, brain and behavior, biological rhythms, and hormones and behavior are the main subjects that will be considered. (Staff)

**ZOOL. 236. MAMMALIAN PHYSIOLOGY. (3)**

Three lectures a week. Prerequisite, a course in physiology. Advanced study of the functioning of the organs of mammalian species. (Staff)

**ZOOL. 237. COMPARATIVE VERTEBRATE ENDOCRINOLOGY. (3)**

Second semester. Three lectures each week. Prerequisite, one semester of biochemistry, physiology and endocrinology. Study of the differences and similarities in the structure and functioning of the endocrine organs of the vertebrate species. (Brinkley)

**ZOOL. 240. ANALYSIS OF ANIMAL POPULATIONS. (4)**

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, a course in ecology or permission of instructor. An advanced course in animal ecology with a focus on population. Studies of growth and regulation of animal populations are emphasized. (Stross)

## ZOOLOGY

### ZOOL. 245. BIOLOGY OF BIRDS. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisite, a course in vertebrate zoology or permission of instructor. Emphasis will be on ecology, behavior, anatomy, systematics, and reproductive physiology, plus field studies of local birds. (Ficken)

### ZOOL. 250. EXPERIMENTAL PARASITOLOGY. (4)

Second semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, a course in parasitology and permission of the instructor. Experiments will be performed utilizing living parasites in laboratory animals to illustrate various aspects of the host-parasite relationship. (Jachowski)

### ZOOL. 251. HELMINTHOLOGY. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, two years of zoology and permission of the instructor. A study of the classification, structure and biology of the helminths. (Haley)

### ZOOL. 252. PROTOZOOLOGY. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, one year of zoology and permission of the instructor. A study of the classification, structure and biology of the protozoa. (Staff)

### ZOOL. 253. PHYSIOLOGY OF SYMBIOSIS. (4)

First semester. Two lectures and two three-hour laboratory periods a week. Prerequisites, one year of biochemistry and permission of instructor. A consideration of the biology of symbiotic organisms, especially the physiological concert existing between host and symbiont. (Staff)

### ZOOL. 260. QUANTITATIVE ZOOLOGY. (4)

First semester. Three lectures and one three-hour laboratory period a week. Prerequisites, Math. 19 or equivalent and permission of the instructor. A consideration of the statistical techniques of principal importance in the analysis of biological data. (Keller)

### ZOOL. 300. ADVANCED TOPICS IN PARASITOLOGY. (Arranged)

Prerequisites, advanced graduate standing and permission of the instructor. The content of the course changes frequently and students may register for it several times. The course will consist of critical discussions of the published literature and current problems in parasitology. 1. host-parasite relationships; 2. ecology of parasites; 3. immunity to parasites; and 4. physiology of parasites.

(Staff)

### ZOOL. 399. RESEARCH. (Arranged)

Work on thesis project only. 1. cytology; 2. embryology; 3. fisheries; 4. genetics; 5. parasitology; 6. physiology; 7. systematics; 8. ecology; 9. behavior; 10. invertebrate zoology; and 11. endocrinology. (Staff)

# The 1965-67 Faculty

## *Administrative Officers*

MANNING, Charles, Dean of the College of Arts and Sciences and Professor of English

B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.

LAFFER, Norman C., Assistant Dean of the College of Arts and Sciences and Professor of Microbiology.

B.S., Allegheny College, 1929; M.S., University of Maine, 1932; Ph.D., University of Illinois, 1937.

BOYD, Alfred C., Jr., Assistant to the Dean of the College of Arts and Sciences and Assistant Professor of Chemistry.

B.S., Canisius College, 1951; M.S., Purdue University, 1953; Ph.D., 1957.

HOUPPERT, Joseph W., Assistant to the Dean of the College of Arts and Sciences and Assistant Professor of English.

Ph.B., University of Detroit, 1955; M.A., University of Michigan, 1957; Ph.D., 1964.

NORTON, Ann E., Assistant to the Dean of the College of Arts and Sciences and Assistant Professor of Foreign Languages

B.A., Syracuse University, 1945; M.A., 1947.

## *Faculty*

ALDRIDGE, Alfred Owen, Professor and Head of Comparative Literature

B.S., Indiana University, 1937; M.A., University of Georgia, 1938; Ph.D., Duke University, 1942; Docteur de l'Universite de Paris, 1956.

ALEXANDER, Peter, Visiting Associate Professor of Philosophy

B.Sc., University of London, 1940; B.A., 1947.

ALLEY, Carroll O., Jr., Associate Professor of Physics

B.S., University of Richmond, 1948; M.A., Princeton University, 1951; Ph.D., 1962.

ALTER, Jean V., Associate Professor of Foreign Languages

License, Universite de Bruxelles, 1948; Docteur de l'Universite, Universite de Paris, 1951; Ph.D., University of Chicago, 1956.

AMBLER, Anne J., Instructor of Foreign Languages

B.A., Oberlin College, 1962; M.A., The Johns Hopkins University, 1964.

AMENT, Marion N., Instructor of Foreign Languages

A.B., Bryn Mawr College, 1944.

ANASTOS, George, Professor and Head of Zoology

B.S., University of Akron, 1942; M.A., Harvard University, 1947; Ph.D., 1949.

ANDERSON, Frank G., Associate Professor of Sociology

A.B., Cornell University, 1941; Ph.D., University of New Mexico, 1951.

## FACULTY

- ANDERSON, J. Robert, Assistant Professor of Physics  
B.S., Iowa State University, 1955; Ph.D., 1963.
- ANDERSON, Judith S., Instructor of Zoology  
B.A., Drew University, 1961.
- ANDERSON, Nancy S., Associate Professor of Psychology  
B.A., University of Colorado, 1952; M.A., Ohio State University, 1953; Ph.D., 1956.
- ANDREWS, Mary L., Associate Professor of English  
B.S., New York University, 1929; M.A., 1935; Ph.D., 1941.
- ANDREWS, Thomas G., Professor and Head of Psychology  
B.A., University of Southern California, 1937; M.A., University of Nebraska, 1939; Ph.D., 1941.
- ARMSTRONG, Douglas H., Instructor of Foreign Languages  
B.A., Middlebury College, 1949; M.A., 1955.
- ARMSTRONG, James C., Assistant Professor of Physics  
B.S., Duke University, 1953; Ph.D., University of Pittsburgh, 1960.
- ATKINSON, Gordon, Associate Professor of Chemistry  
B.S., Lehigh University, 1952; Ph.D., Iowa State University, 1956.
- AUSLANDER, Joseph, Associate Professor of Mathematics  
B.S., Massachusetts Institute of Technology, 1952; M.S., University of Pennsylvania, 1953; Ph.D., 1957.
- EVERY, William T., Professor and Head of Classical Languages and Literatures  
B.A., Western Reserve University, 1934; M.A., 1935; Ph.D., 1937; Fellow of the American Academy in Rome, 1937-39.
- AYLWARD, Thomas J., Associate Professor of Speech and Dramatic Art  
B.S., University of Wisconsin, 1947; M.S., 1949; Ph.D., 1960.
- BAILEY, William J., Research Professor of Chemistry  
B.S., University of Minnesota, 1943; Ph.D., University of Illinois, 1946.
- BAKER, Donald J., Assistant Professor of Speech and Dramatic Art  
B.S., Ohio State University, 1954; M.A., 1956; Ph.D., 1962.
- BARDASIS, Angelo, Assistant Professor of Physics  
B.A., Cornell University, 1957; M.S., University of Illinois, 1959; Ph.D., 1962.
- BARI, Ruth L., Instructor of Mathematics  
B.A., Brooklyn College, 1939; M.A., The Johns Hopkins University, 1943.
- BARNES, Jack C., Associate Professor of English  
B.A., Duke University, 1939; M.A., 1947; Ph.D., University of Maryland, 1954.
- BARRABINI, Micheline, Instructor of Foreign Languages  
License es-Lettres, University of Aix-en-Provence, 1955.

- BARTLETT, Claude J.**, Associate Professor of Psychology  
B.S., Denison University, 1954; M.A., Ohio State University, 1956; Ph.D., 1958.
- BATKA, George F.**, Associate Professor of Speech and Dramatic Art  
B.A., Wichita University, 1938; M.A., University of Michigan, 1941.
- BATTIG, William F.**, Professor of Psychology  
B.S., Northwestern University, 1951; M.S., University of Wisconsin, 1953; Ph.D., 1955.
- BAUER, Richard H.**, Professor of History  
B.A., University of Chicago, 1924; M.A., 1928; Ph.D., 1935.
- BEALL, Edgar F.**, Assistant Professor of Physics  
B.A., University of California (Berkeley), 1958; Ph.D., 1962.
- BEALL, Otho T., Jr.**, Associate Professor of English and Executive Secretary of American Studies  
B.A., Williams College, 1930; M.A., University of Minnesota, 1933; Ph.D., University of Pennsylvania, 1952.
- BEARDON, Alan Frank**, Visiting Assistant Professor of Mathematics  
B.S., Queen Mary College, London University, 1961; Ph.D., London University, 1964.
- BEAUCHAMP, Virginia W.**, Instructor of English  
B.A., University of Michigan, 1942; M.A., 1948; Ph.D., University of Chicago, 1955.
- BELL, Roger A.**, Assistant Professor of Physics and Astronomy  
B.Sc., University of Melbourne, 1957, Ph.D., Australian National University, 1962.
- BELLAMA, Jon Michael**, Assistant Professor of Chemistry  
A.B., Allegheny College, 1960; Ph.D., University of Pennsylvania, 1965.
- BENESCH, William M.**, Associate Professor of Molecular Physics  
B.A., Lehigh University, 1942; M.A., The Johns Hopkins University, 1950; Ph.D., 1952.
- BENNETT, Lawrence H.**, Associate Professor of Physics  
B.A., Brooklyn College, 1951; M.S., University of Maryland, 1955; Ph.D., Rutgers University, 1958.
- BERES, William Philip**, Research Associate in Physics  
B.S., Massachusetts Institute of Technology, 1959; Ph.D., 1964.
- BERMAN, Joel H.**, Associate Professor of Music  
B.S., Julliard School of Music, 1951; M.A., Columbia University, 1953; D.M.A., University of Michigan, 1961.
- BERNHARDT, Miriam E.**, Instructor of Mathematics  
B.S., University of Maryland, 1953.

## FACULTY

BERNSTEIN, Emil O., Associate Professor of Zoology

B.A., Syracuse University, 1951; M.S., 1953; Ph.D., University of California (Los Angeles), 1956.

BERNSTEIN, Melvin, Assistant Professor of Music

A.B., Southwestern at Memphis, 1947; B.Mus., 1948; M.Mus., University of Michigan, 1949; M.A., University of North Carolina, 1954; Ph.D., 1964.

BETTEX, Albert, Visiting Professor of Foreign Languages

Ph.D., University of Basel, 1933.

BETTINGER, Richard T., Assistant Professor of Physics

B.S., Syracuse University, 1955; Ph.D., University of Maryland, 1965.

BEVERIDGE, Charles E., Lecturer in History

A.B., Harvard University, 1956; M.S., University of Wisconsin, 1959.

BHAGAT, Satindar T., Assistant Professor of Physics

B.A., Jammu and Kashmir University, 1950; M.Sc., University of Delhi, 1953; Ph.D., 1956.

BINGHAM, Alfred J., Professor of Foreign Languages

B.A., Yale University, 1933; Ph.D., Columbia University, 1939.

BIRDSALL, Esther K., Assistant Professor of English

B.A., Central Michigan College, 1947; M.A., University of Arizona, 1950; Ph.D., University of Maryland, 1958.

BLOCK, Barry, Assistant Professor of Physics

M.S., Massachusetts Institute of Technology, 1957; Ph.D., 1962.

BODE, Carl, Professor of English

Ph.B., University of Chicago, 1933; M.A., Northwestern University, 1938; Ph.D., 1941; Fellow of the Royal Society of Literature of the United Kingdom.

BOJARSKY, Edmund A., Instructor of English

B.S., University of Wisconsin, 1949; M.A., 1950.

BOYD, Alfred C., Jr., Assistant Professor of Chemistry and Assistant to the Dean of the College of Arts and Sciences

B.S., Canisius College, 1951; M.S., Purdue University, 1953; Ph.D., 1957.

BOYD, Ursel D., Assistant Professor of Foreign Languages

L.I.B., Washington University, 1954; M.A., University of Maryland, 1960; Ph.D., 1963

BRACE, John W., Professor of Mathematics

B.A., Swarthmore College, 1949; M.A., Cornell University, 1951; Ph.D., 1953.

BRADY, Joseph V., Professor of Psychology

B.S., Fordham University, 1943; Ph.D., University of Chicago, 1951.

BRESLOW, Marvin A., Assistant Professor of History

B.A., University of Nebraska, 1957; M.A., Harvard University, 1958; Ph.D., 1963.

BRIDGERS, Furman A., Foreign Student Adviser and Assistant Professor of Foreign Languages

B.A., Duke University, 1925; M.A., University of Chicago, 1928.

BRINKLEY, Howard J., Assistant Professor of Zoology

B.A., West Virginia University, 1958; M.S., University of Illinois, 1960; Ph.D., 1963.

BRODBECK, May, Visiting Professor of Philosophy

B.A., New York University, 1941; M.A., State University of Iowa, 1945; Ph.D., 1947.

BROSNAHAN, Leger N., Assistant Professor of English

B.A., Georgetown University, 1951; M.A., Harvard University, 1952; Ph.D., 1958.

BROWN, John H., Assistant Professor of Philosophy

A.B., Princeton University, 1952; M.A., 1957; Ph.D., 1959.

BROWN, Joshua R. C., Associate Professor of Zoology

B.A., Duke University, 1948; M.A., 1949; Ph.D., 1953.

BROWN, Margaret L., Instructor of Mathematics

B.S., Columbia University, 1943; M.A., 1948.

BROWN, Samuel E., Associate Professor of English

B.A., Indiana University, 1934; M.A., 1946; Ph.D., Yale University, 1955.

BRYER, Jackson R., Assistant Professor of English

B.A., Amherst College, 1959; M.A., Columbia University, 1960; Ph.D., University of Wisconsin, 1965.

BUCY, Richard S., Assistant Professor of Mathematics

B.S., Massachusetts Institute of Technology, 1957; Ph.D., University of California (Berkeley), 1963.

BUHLIG, Paul, Jr., Instructor of English

B.S.S., Georgetown University, 1950; M.A., University of California (Berkeley), 1954.

BURHOE, Sumner O., Professor Emeritus of Zoology

B.S., University of Massachusetts, 1925; M.S., Kansas State College, 1926; Ph.D., Harvard University, 1937.

BURN, Brian, Research Associate in Physics

B.Sc., Otago University, 1959; M.Sc., 1960; Ph.D., Cambridge University, 1964.

CALLCOTT, George H., Associate Professor of History

B.A., University of South Carolina, 1950; M.A., Columbia University, 1951; Ph.D., University of North Carolina, 1956.

CAP, Jeannine, Instructor of Foreign Languages

B.A., Temple University, 1964.

## FACULTY

- CAP, Jean-Pierre, Instructor of Foreign Languages  
B.A., Temple University, 1957; M.A., 1960; M.A., University of Pennsylvania, 1960.
- CARLSON, G. Bert, Jr., Instructor of English  
A.B., Upsala College, 1957; M.A., University of Iowa, 1962.
- CARMELI, Moshe, Research Associate in Physics  
M.Sc., The Hebrew University, 1960; D.Sc., Israel Institute of Technology, 1964.
- CARRUTHERS, John T., Assistant Professor of Chemistry
- CARTER, John Francis, Instructor of Speech and Dramatic Art  
B.S., Maryland State Teachers College (Frostburg), 1953; M.A., University of Maryland, 1958.
- CATE, Allen G., Instructor of English  
B.A., Rutgers University, 1960; M.A., Duke University, 1962.
- CAUSEY, George D., Associate Research Professor of Speech and Dramatic Art  
B.S., University of Maryland, 1950; M.A., 1951; Ph.D., Purdue University, 1954.
- CELARIER, James L., Assistant Professor of Philosophy  
A.B., University of Illinois, 1956; M.A., 1958; Ph.D., University of Pennsylvania, 1960.
- CHEN, Chunjen C., Assistant Professor of Foreign Languages  
B.S., Cornell University, 1919; M.S., University of Maryland, 1920.
- CHIEFFO, Clifford, Instructor in Art  
B.S., Southern Connecticut State College, 1959; M.A., Columbia University, 1963.
- CHOU, Kyong Chol, Visiting Lecturer in Astronomy  
B.Sc., Chosun Christian University, 1953; B.A., Tusculum College, 1955; M.S., University of Pennsylvania, 1959; Ph.D., 1962.
- CHRISTOV, Gabriella T., Instructor of Foreign Languages  
Licenza Liceale, Liceo A. D'Oria, Geona, 1945; Dottore in Lettere, University of Genoa, 1950.
- CLEM, John Richard, Research Associate in Physics  
B.S., University of Illinois, 1960; M.S., 1962; Ph.D., 1965.
- CLEMENS, Lucienne C., Instructor of Foreign Languages  
B.A.E., California College of Arts and Crafts, 1938.
- CLEMENS, Siegfried M., Instructor of Foreign Languages  
B.S., University of Maryland, 1961.
- COATES, Charles H., Assistant Professor of Sociology  
B.S., United States Military Academy, 1924; M.A., Louisiana State University, 1952; Ph.D., 1955.
- COHEN, Leon W., Professor and Head of Mathematics  
A.B., Columbia University, 1923; A.M., 1925; Ph.D., University of Michigan, 1928.

- COLE, Mildred B., Lecturer in Mathematics  
B.S., University of Illinois, 1943; M.S., University of Wisconsin, 1951.
- COLE, Wayne S., Professor of History  
B.A., Iowa State Teachers College, 1946; M.S., University of Wisconsin, 1948; Ph.D., 1951.
- CONDON, Paul E., Assistant Professor of Physics  
A.B., Harvard College, 1955; Ph.D., Princeton University, 1961.
- CONKIN, Paul K., Associate Professor of History  
B.A., Milligan College, 1951; M.A., Vanderbilt University, 1953; Ph.D., 1957.
- CONNORS, Philip I., Research Associate in Physics  
B.S., University of Notre Dame, 1959; M.S., Pennsylvania State University, 1962; Ph.D., 1965.
- COOK, Mary S., Instructor of Foreign Languages  
B.A., Denison University, 1934; M.A., Western Reserve University, 1937.
- COOLEY, Franklin D., Professor of English  
B.A., The Johns Hopkins University, 1927; M.A., University of Maryland, 1933; Ph.D., The Johns Hopkins University, 1940.
- COOPER, Sherod M., Jr., Assistant Professor of English  
B.S., Temple University, 1951; M.A., 1953; Ph.D., University of Pennsylvania, 1963.
- CORREL, Ellen, Associate Professor of Mathematics  
B.S., Douglass College, Rutgers University, 1951; M.S., Purdue University, 1953; Ph.D., 1957.
- COSENTINO, Gloria, Instructor of Music  
B.S. in Mus. Ed., Duquesne University, 1952; M. Mus., 1962.
- COULTER, John L., Assistant Professor of English  
B.A., The American University, 1934; M.A., University of North Carolina, 1936.
- CRAVEN, Dorothy D., Assistant Professor of Speech and Dramatic Art  
B.S., Missouri State Teachers College, 1945; M.A., State University of Iowa, 1948.
- CRENSHAW, John W., Jr. Professor of Zoology  
B.A., Emory University, 1948; M.S., University of Georgia, 1951; Ph.D., University of Florida, 1955.
- CROWCROFT, Harry G., Assistant Instructor of Mathematics  
B.S., Western Illinois University, 1959; M.S., 1961.
- CROZIER, Alice E., Instructor of English  
B.A., St. Joseph's College (Maine), 1942; M.A., The Catholic University of America, 1953.
- CURRIER, Albert W., Instructor of Mathematics  
B.A., State University of Iowa, 1954; M.A., The Johns Hopkins University, 1959.

## FACULTY

CUSSLER, Elise B., Lecturer in Mathematics

B.S., New York State College for Teachers, 1925; M.S., Syracuse University, 1937.

CUSSLER, Margaret T., Associate Professor of Sociology

B.A., New York State Teachers College (Albany), 1933; M.A., Radcliffe College, 1941; Ph.D., 1943.

CUSTER, Melanie, Instructor of English

B.A., Radcliffe College, 1961.

DACHSLAGER, Earl L., Instructor of English

B.A., University of Arizona, 1959; M.A., University of Maryland, 1963.

DANIEL, Klaus H., Assistant Professor of Mathematics

B.A., University of Cologne, 1954; M.A., University of Gottingen, 1957; M.A., University of California (Berkeley), 1959; Ph.D., 1961.

DASTON, Paul G., Professor of Psychology

B.A., Northwestern University, 1948; M.A., Michigan State University, 1950; Ph.D., 1952.

DAY, Thomas B., Professor of Physics

B.S., University of Notre Dame, 1952; Ph.D., Cornell University, 1957.

de LEIRIS, Alain, Associate Professor of Art

B.F.A., Rhode Island School of Design, 1948; A.M., Harvard University, 1952; Ph.D., 1957.

DEMAITRE, Ann, Assistant Professor of Foreign Languages

B.A., Columbia University, 1950; M.A., University of California (Berkeley), 1951; M.S., Columbia University, 1952; Ph.D., University of Maryland, 1965.

DEMAREE, Constance H., Instructor of English

B.A., University of Maryland, 1944; M.A., 1945.

DENNY, Don, Assistant Professor of Art

B.A., University of Florida, 1959; M.A., Institute of Fine Arts, New York University, 1961.

de ROCCO, Andrew G., Assistant Professor of Molecular Physics

B.S., Purdue University, 1951; M.S., University of Michigan, 1953; Ph.D., 1956.

de SILVA, Alan W., Assistant Professor of Physics

B.S., University of California (Los Angeles), 1954; Ph.D., University of California (Berkeley), 1961.

DETENBECK, Robert Warren, Associate Professor of Physics

B.S., University of Rochester, 1954; Ph.D., Princeton University, 1962,

de VERMOND, Mary F., Assistant Professor of Music

B.Mus., Howard University, 1942; M.A., Columbia University, 1948; Ed.D., University of Maryland, 1959.

- di BELLA, Edward, Assistant Professor of Sociology  
B.S., Washington University, 1936; M.A., 1938; Ph.D., The Catholic University of America, 1963.
- DIEMER, Emma Lou, Assistant Professor of Music  
B.M., Yale University, 1949; M.M., 1950; Ph.D., Eastman School of Music, 1960.
- di LAVORE, Philip, III, Assistant Professor of Physics  
B.A., Dakota Wesleyan University, 1954; M.S., University of Michigan, 1961; Ph.D., 1965.
- DIXON, Jack R., Associate Professor of Physics  
B.S., Western Reserve University, 1948; M.S., 1950; Ph.D., University of Maryland, 1956.
- DIXON, W. Graham, Research Associate in Physics  
B.A., Cambridge University, 1962; Ph.D., Churchill College, Cambridge University, 1965.
- DOBERT, Eitel W., Associate Professor of Foreign Languages  
B.A., University of Geneva, 1932; M.A., University of Maryland, 1949; Ph.D., 1954.
- DOERR, Paul L., Instructor of Sociology  
B.A., University of Maryland, 1928; M.A., 1963.
- DOETSCH, Raymond N., Professor of Microbiology  
B.S., University of Illinois, 1942; M.S., Indiana University, 1943; Ph.D., University of Maryland, 1948.
- DORFMAN, J. Robert, Assistant Professor of Physics  
A.B., The Johns Hopkins University, 1957; Ph.D., 1961.
- DOSS, Mildred A., Research Associate in Zoology  
B.A., University of New Mexico, 1925; B.S., University of Illinois, 1928.
- DOUDNA, Mark E., Assistant Professor of Speech and Dramatic Art  
B.S., Ohio State University, 1948; M.A., 1956; Ph.D., 1962.
- DOUGLIS, Avron, Professor of Mathematics  
A.B., University of Chicago, 1938; M.S., New York University, 1948; Ph.D., 1949.
- DRAFT, James Alexander, Assistant Professor of Physics  
A.B., Calvin College, 1957; Ph.D., University of California (Berkeley), 1963.
- DUECKER, Heyman C., Research Associate in Chemistry  
B.S., Marion College, 1950; M.S., University of Toledo, 1956; Ph.D., University of Maryland, 1964.
- DUFFY, John J., Assistant Professor of English  
B.S.S., Georgetown University, 1957; M.A., University of Vermont, 1958; Ph.D., Syracuse University, 1964.

## FACULTY

- DUNHAM, Richard L., Associate Professor of Music  
B.Mus., Ohio Wesleyan University, 1947; M.Mus., University of Michigan, 1949;  
Ph.D., 1961.
- DUNN, Norma E., Instructor of English  
B.A., Madison College, 1946; M.A., University of Pennsylvania, 1953.
- DYER, Thomas H. Assistant Professor of Mathematics  
B.S., United States Naval Academy, 1924.
- DYSON, Lowell K., Lecturer in History  
B.S., Iowa State University, 1952; M.A., Columbia University, 1959.
- EARL, James A., Associate Professor of Physics  
B.S., Massachusetts Institute of Technology, 1953; Ph.D., 1957.
- EBERHAGEN, Arndt, Visiting Associate Professor of Physics  
B.S., Gottingen University, 1951; M.S., 1955; Ph.D., 1955.
- EDEN, Richard John, Visiting Professor of Physics  
B.A., University of Cambridge, 1943; M.A., 1947; Ph.D., 1951.
- EDGERTON, Harold A., Professor of Psychology  
B.A., Kansas State Teachers College, 1924; Ph.D., Ohio State University, 1928.
- EGAN, Howard L., Assistant Professor of Mathematics  
B.A., Washington University, 1960; M.A., 1962; Ph.D., 1965.
- EHRlich, Gertrude, Associate Professor of Mathematics  
B.S., Georgia State College for Women, 1943; M.A., University of North Carolina,  
1945; Ph.D., University of Tennessee, 1953.
- EIKEL, Elizabeth M., Instructor of English  
B.A., Tulane University, 1952; M.A., 1954.
- EISENBERG, John F., Assistant Professor of Zoology  
B.S., Washington State University, 1957; M.A., University of California (Berkeley), 1959; Ph.D., 1962.
- EISENSTADT, Beula B., Assistant Professor of Music  
B.A., Queens College, 1949; M.A., Columbia University, 1954.
- ELBL, Alena, Research Assistant Professor of Zoology  
B.S., University of Maryland, 1954; M.S., 1958; Ph.D., 1964.
- ERICKSON, William G., Associate Professor of Physics and Astronomy  
B.A., University of Minnesota, 1951; M.A., 1955; Ph.D., 1956.
- ESTABROOK, Gaylord B., Professor of Physics  
B.S., Purdue University, 1921; M.S., Ohio State University, 1922; M.S., The Johns  
Hopkins University, 1930; Ph.D., University of Pittsburgh, 1932.
- EVANS, Marilyn Jane, Assistant Professor of Comparative Literature and Chinese  
A.B., Middlebury College, 1958; Ph.D., Yale University, 1965.

- FABER, John E., Professor and Head of Microbiology  
B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.
- FALK, David S., Associate Professor of Physics  
B.S., Cornell University, 1954; M.S., Harvard University, 1955; Ph.D., 1959.
- FANOS, Stavroula, Instructor of Music  
B.Mus.Ed., Oberlin Conservatory, 1957; M.Ed., University of Maryland, 1963.
- FARR, Marion Margaret, Research Associate in Zoology  
A.B., Syracuse University, 1925; M.A., 1929.
- FELDMANN, Barbara W., Instructor of English  
B.A., Mount Mercy College, 1961; M.A., University of Maryland, 1964.
- FERRELL, Richard A., Professor of Physics  
B.S., California Institute of Technology, 1948; M.S., 1949; Ph.D., Princeton University, 1952.
- FICKEN, Millicent S., Research Associate in Zoology  
B.S., Cornell University, 1955; Ph.D., 1960.
- FICKEN, Robert W., Assistant Professor of Zoology  
B.S., Cornell University, 1953; Ph.D., 1960.
- FINK, Beatrice C., Instructor of Foreign Languages  
Certificate Institut d'Etudes Politiques, 1952; B.A., Bryn Mawr College, 1953; Certificate Institut d'Etudes Politiques, 1954; M.A., Yale University, 1956.
- FIROUZABADI, Ahmad, Assistant Instructor of Mathematics  
B.S., University of Tehran, 1954; M.S., University of Maryland, 1960.
- FITZGERALD, Jon M., Instructor of Speech and Dramatic Art  
B.A., Michigan State University, 1963; M.A., Bowling Green State University, 1964.
- FITZMAURICE, James E., Instructor of English  
B. S., Saint Peter's College, 1954; M. A., University of California (Los Angeles), 1962.
- FIVEL, Daniel I., Assistant Professor of Physics  
B.A., The Johns Hopkins University, 1953; Ph.D., 1959.
- FLEMING, Rudd, Associate Professor of English  
B.A., University of Chicago, 1930; M.A., Cornell University, 1932; Ph.D., 1934.
- FLETCHER, Ian, Visiting Lecturer in English  
Ph.D., University of Reading, 1965.
- FOLSOM, Kenneth E., Assistant Professor of History  
A.B., Princeton University, 1943; A.B., University of California (Berkeley), 1955; M.A., 1957; Ph.D., 1964.
- FONT, Marie T., Instructor of Foreign Languages  
B.A., Universidad de Oriente (Cuba), 1960.

## FACULTY

FORMAN, Gail I., Instructor of English

B.A., University of Maryland, 1961; M.A., 1964.

FRANK, Allan D., Assistant Professor of Speech and Dramatic Art

B.S., University of Wisconsin, 1953; M.S., 1954.

FRANZ, Jacob G., Assistant Professor of Sociology

B.A., Southwestern Oklahoma State Teachers College, 1935; M.A., Columbia University, 1939; Ph.D., Ohio State University, 1960.

FREEMAN, Robert S., Associate Professor of Mathematics

B.S., New York University, 1947; Ph.D., University of California (Berkeley), 1959.

FREENY, Ralph D., Instructor of Art

B.A., University of Maryland, 1959.

FRETZ, Bruce R., Assistant Professor of Psychology

B.A., Gettysburg College, 1961; M.A., Ohio State University, 1963; Ph.D., 1965.

FRIEDMAN, Herbert, Professor of Physics

B.A., Brooklyn College, 1936; Ph.D., The Johns Hopkins University, 1940.

FRIEDMAN, Melvin J., Associate Professor of Comparative Literature

B.A., Bard College, 1949; M.A., Columbia University, 1951; Ph.D., Yale University, 1954.

FUKUTOMI, Hiroshi, Research Associate in Chemistry

Graduate in Chemistry, Tokyo Institute of Technology, 1952; Ph.D., 1960.

FUNG, David Ping-Chi, Research Associate in Chemistry

B.S., University of British Columbia, 1959; Ph.D., University of Windsor, 1964.

FUSSELL, Lois Ann, Instructor in Speech and Dramatic Art

B.A., Louisiana State University, 1962; M.A., 1964.

GADZIOLA, David S., Instructor of English

B.A., University of Maryland, 1961.

GAINER, Harold, Assistant Professor of Zoology

B.S., City College of New York, 1956; Ph.D., University of California (Berkeley) 1959.

GALLAGHER, Charles C., Jr., Instructor of Music

B.Mus., University of Michigan, 1950; M.Mus., 1952.

GARRETT, Marie K., Instructor of Mathematics

A.B., George Washington University, 1928.

GARSTENS, Helen M., Assistant Professor of Mathematics

B.A., Hunter College, 1932.

GARVEY, Evelyn F., Assistant Professor of Music

B.S., Temple University, 1943; M.M., Eastman School of Music, 1946.

- GERSTER, Dale E., Visiting Lecturer in Physics  
A.B., Transylvania College, 1936.
- GIFFIN, Donald W., Assistant Professor of History  
B.A., University of California (Santa Barbara), 1950; M.A., Vanderbilt University, 1956; Ph.D., 1962.
- GLAD, Paul W., Associate Professor of History  
B.S., Purdue University, 1947; M.A., Indiana University, 1949; Ph.D., 1957.
- GLASSER, Robert G., Associate Professor of Physics  
A.B., University of Chicago, 1948; B.S., 1950; M.S., 1952; Ph. D., 1954.
- GLICK, Arnold J., Assistant Professor of Physics  
B.A., Brooklyn College, 1955; Ph.D., University of Maryland, 1961.
- GLINOS, Andre D., Research Professor of Zoology  
Doctor of Medicine, National University of Athens, 1941.
- GLOVER, Edward L., Assistant Instructor of Zoology  
B.S., Atlantic Christian College, 1962; M.S., University of Maryland, 1965.
- GLOVER, Rolfe E., III, Associate Professor of Physics  
A.B., Bowdoin College, 1948; B.S., Massachusetts Institute of Technology, 1948; Ph.D., University of Gottingen, 1953.
- GOLANN, Stuart E., Assistant Professor of Psychology  
B.A., Queens College, 1957; M.A., University of North Carolina, 1959; Ph.D., 1961.
- GOLDBERG, Seymour, Associate Professor of Mathematics  
A.B., Hunter College, 1950; M.A., Ohio State University, 1952; Ph.D., University of California (Los Angeles), 1958.
- GOLDHABER, Jacob K., Professor of Mathematics  
B.A., Brooklyn College, 1944; M.A., Harvard University, 1945; Ph.D., University of Wisconsin, 1950.
- GOLDMAN, Lawrence, Assistant Professor of Zoology  
B.S., Tufts University, 1958; Ph.D., University of California (Los Angeles), 1964.
- GOLDSTONE, Peter J., Lecturer in Philosophy  
B.A., University of Wisconsin, 1961.
- GOLLUB, Lewis R., Associate Professor of Psychology  
A.B., University of Pennsylvania, 1955; Ph. D., Harvard University, 1958.
- GOOD, Richard A., Professor of Mathematics  
B.A., Ashland College, 1939; M.A., University of Wisconsin, 1940; Ph. D., 1945.
- GOODWYN, Frank, Professor of Foreign Languages  
B.A., Texas College of Arts and Industries, 1939; M.A., 1940; Ph.D., University of Texas, 1946.

## FACULTY

- GORDON, Donald C., Professor of History  
B.A., College of William and Mary, 1934; M.A., Columbia Teachers College, 1938; Ph.D., Columbia University, 1947.
- GORDON, Evelyn W., Instructor of Sociology  
B.A., University of Maryland, 1962; M.A., 1963.
- GORDON, Gilbert, Associate Professor of Chemistry  
B.S., Bradley University, 1955; Ph.D., Michigan State University, 1959.
- GORDON, Stewart L., Assistant Professor of Music  
B.A., Kansas University, 1953; M.A., 1954; D.M.A., Eastman School of Music, 1965.
- GOSSAGE, Forest D., Instructor of Speech and Dramatic Art  
B.A., University of Maryland, 1957; M.A., University of Nebraska, 1961.
- GRAMBERG, Eduard, Associate Professor of Foreign Languages  
Ph.D., University of California (Berkeley), 1956.
- GRAVELY, William H., Jr., Associate Professor of English  
B.A., College of William and Mary, 1925; M.A., University of Virginia, 1934; Ph.D., 1953.
- GRAY, Diane D., Instructor of Foreign Languages  
B.A., Mount Holyoke, 1948; M.A., University of Kansas, 1951.
- GRAY, William L., Instructor of Foreign Languages  
A.B., Middlebury College, 1955; A.M., Middlebury Graduate School in France, 1956.
- GREENBERG, Leon, Associate Professor of Mathematics  
B.S., College of the City of New York, 1953; M.A., Yale University, 1955; Ph.D., 1958.
- GREENBERG, Louis M., Assistant Professor of History  
A.B., Brooklyn College, 1954; M.A., Harvard University, 1957; Ph.D., 1963.
- GREENBERG, Meyer, Assistant Professor of Foreign Languages  
B.A., Yeshiva University, 1934; M.A., Jewish Institute of Religion, 1944; Ph.D., University of Maryland, 1956.
- GREENBERG, Oscar Wallace, Associate Professor of Physics  
B.S., Rutgers University, 1952; M.S., Princeton University, 1954; Ph.D., 1956.
- GRENTZER, Rose Marie, Professor of Music  
B.A., Carnegie Institute of Technology, 1935; B.A., 1936; M.A., 1939.
- GRIEM, Hans R., Professor of Physics  
Arbitur, Max Planck Schule, 1949; Ph.D., Universitat Kiel, 1954.
- GRIM, Samuel O., Associate Professor of Chemistry  
B.S., Franklin and Marshall College, 1956; Ph.D., Massachusetts Institute of Technology, 1960.

- GRIMES, Katherine H., Instructor of English  
B.A., University of Maryland, 1953; M.A., 1954.
- GRISMER, Margaret J., Instructor of Zoology  
B.S., University of Akron, 1947; M.S., University of Wisconsin, 1949.
- GROLLMAN, Sidney, Associate Professor of Zoology  
B.S., University of Maryland, 1947; M.S., 1949; Ph.D., 1952.
- GROSSMAN, Morton, Assistant Professor of Art  
B.A., Queens College, 1948.
- GRUBAR, Francis S., Assistant Professor of Art  
B.A., University of Maryland, 1948; M.A., 1949; M.A., The Johns Hopkins University, 1952.
- GULICK, Sidney L., Assistant Professor of Mathematics  
B.A., Oberlin College, 1958; M.A., Yale University, 1960; Ph.D., 1963.
- GUSS, Donald Eugene, Visiting Assistant Professor of Physics  
B.S., South Dakota State College, 1952; M.A., Washington University (St. Louis), 1954; Ph.D., 1961.
- GUTSCHE, Graham, Visiting Lecturer in Physics  
B.S., University of Colorado, 1950; M.S., University of Minnesota, 1952; Ph.D., The Catholic University of America, 1960.
- HABERL, Franz P., Assistant Professor of Foreign Languages  
B.A., Ursinus College, 1959; M.A., Cornell University, 1961; Ph.D., 1964.
- HAGGE, Donald E., Visiting Lecturer in Physics  
A.B., University of California (Berkeley), 1958; Ph.D., 1963.
- HALEY, A. James, Professor of Zoology  
B.S., University of New Hampshire, 1949; M.S., 1950; Sc.D., The John Hopkins University, 1955.
- HALEY, Kathleen, Assistant Professor of Music  
B.Mus., Michigan State University, 1949; M.Mus., 1951; D.M.A., University of Michigan, 1964.
- HALL, Douglas R., Instructor of Foreign Languages  
B.A., Wake Forest College, 1952; M.A., University of Maryland, 1959.
- HALL, Thomas W., Assistant Professor of Foreign Languages  
B.A., University of Maryland, 1938; M.A., Middlebury College, 1950; Ph.D., University of Maryland, 1958.
- HAMER, Justin C., Research Associate in Chemistry  
M.S., Pacific Union College, 1949; Ph.D., University of Mexico, 1962.
- HANSEN, Janet C., Research Associate of Zoology  
B.S., Oregon State University, 1956; M.S., University of Minnesota, 1957; Ph.D., University of Wisconsin, 1964.

## FACULTY

- HANSEN, P. Arne, Professor of Microbiology  
B.Ph., University of Copenhagen, 1922; M.S., 1926; Ph.D., Cornell University, 1931.
- HARPER, Glenn A., Assistant Professor of Sociology  
B.S., Purdue University, 1958; M.S., 1961.
- HARRIS, Reece Thomas, Associate Professor of Mathematics  
B.A., Reed College, 1955; M.A., University of Illinois, 1956; Ph.D., 1959.
- HAYWARD, Raymond W., Professor of Physics  
B.S., Iowa State College, 1943; Ph.D., University of California (Berkeley), 1950.
- HEAD, Emerson W., Assistant Professor of Music  
B.Mus., University of Michigan, 1957; M.Mus., 1961.
- HEDLUND, James L., Lecturer in Speech and Dramatic Art  
B.A., State University of Iowa, 1950; M.A., 1951; Ph.D., 1953.
- HEERMAN, Emil F., Associate Professor and Assistant Head of Psychology  
B.A., University of Cincinnati, 1952; M.A., Ohio State University, 1957; Ph.D., 1959.
- HEIM, Norman, Assistant Professor of Music  
B.Mus.Ed., Evansville College, 1951; M.Mus., Eastman School of Music, 1952; D.M.A., 1962.
- HELZER, Garry A., Assistant Professor of Mathematics  
B.A., Portland State College, 1959; M.A., Northwestern University, 1962; Ph.D., 1964.
- HENDRICKS, Richard, Professor of Speech and Dramatic Art  
B.A., Franklin College, 1937; M.A., Ohio State University, 1939; Ph.D., 1956.
- HENERY-LOGAN, Kenneth R., Associate Professor of Chemistry  
B.Sc., McGill University, 1942; Ph.D., 1946.
- HENKEL, Ramon E., Assistant Professor of Sociology  
Ph.B., University of North Dakota, 1958; M.A., University of Wisconsin, 1961.
- HENKELMAN, James M., Assistant Professor of Mathematics  
B.S., Miami University, 1954; M.Ed., 1955; Ed.D., Harvard University, 1965.
- HERDOIZA, Eulalia J., Instructor of Foreign Languages  
B.A., Manuela Canizares, 1945; M.A., University of Maryland, 1960.
- HERING, Christoph A., Associate Professor of Foreign Languages  
Ph.D., University of Bonn, 1950.
- HERMAN, Harold J., Assistant Professor of English  
A.B., University of Maryland, 1952; Ph.D., University of Pennsylvania, 1960.
- HETRICK, Frank M., Associate Professor of Microbiology  
B.S., Michigan State University, 1954; M.S., University of Maryland, 1960; Ph.D., 1962.

- HIGGS, William J., Assistant Professor of Psychology  
B.A., University of Nebraska, 1960; M.A., University of Illinois, 1964; Ph.D., 1965.
- HIGHTON, Richard T., Associate Professor of Zoology  
B.A., New York University, 1950; M.S., University of Florida, 1953; Ph.D., 1956.
- HINDS, George, Research Associate in Physics  
A.B., Bowdoin College, 1955; Ph.D., University of Maryland, 1965.
- HIRZEL, Robert K., Associate Professor of Sociology  
B.A., Pennsylvania State College, 1946; M.A., 1950; Ph.D., Louisiana State University, 1954.
- HITCHCOCK, Donald, Assistant Professor of Foreign Languages  
B.A., University of Maryland, 1952; M.A., Harvard University, 1954; Ph.D., 1965.
- HODOS, William, Assistant Professor of Psychology  
B.S., Brooklyn College, 1955; M.A., University of Pennsylvania, 1957; Ph.D., 1960.
- HOFFSOMMER, Harold C., Professor and Head of Sociology  
B.A., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.
- HOLMGREN, Harry D., Professor of Physics  
B. of Physics, University of Minnesota, 1949; M.A., 1950; Ph.D., 1954.
- HOLTON, William M., Instructor of English  
B.A., Dartmouth College, 1954; L.L.B., Harvard University, 1957; M.A., Yale University, 1959.
- HOLTON, Sylvia W., Assistant Professor of English  
B.A., Radcliffe College, 1958; M.A., Wayne State University, 1959; Ph.D., Yale University, 1963.
- HORAK, Milan, Research Associate in Chemistry  
R.N.Dr., Charles University (Prague), 1950; C.Sc., Chemical Institute, Czechoslovak Academy of Sciences, 1955.
- HORIE, Hisashi, Visiting Professor of Physics  
B.Eng., Tokyo Imperial University, 1945; B.Sc., University of Tokyo, 1949; D.Sc., 1954.
- HORNYAK, William Frank, Professor of Physics  
B.E.E., College of the City of New York, 1944; M.S., California Institute of Technology, 1946; Ph.D., 1949.
- HORRELL, Joyce T., Instructor of English  
B.A., University of Maryland, 1960; M.A., 1963.
- HORVATH, John, Professor of Mathematics  
Ph.D., University of Budapest, 1947.
- HOUPPERT, Joseph W., Assistant Professor of English and Assistant to the Dean of the College of Arts and Sciences.  
Ph.B., University of Detroit, 1955; M.A., University of Michigan, 1957; Ph.D., 1964.

## FACULTY

- HOVEY, Richard B., Associate Professor of English  
B.A., University of Cincinnati, 1942; M.A., Harvard University, 1943; Ph.D., 1950.
- HOWARD, John D., Instructor of English  
B.A., Washington College, 1956; M.A., University of Maryland, 1962.
- HU, Margaret T. W., Instructor of Foreign Languages  
B.A., Ginling College, 1943.
- HUBBE, Rolf O., Assistant Professor of Classical Languages and Literatures  
B.A., Hamilton College, 1947; M.A., Princeton University, 1950; Ph.D., 1950.
- HUHEEY, James E., Assistant Professor of Chemistry  
B.S., University of Cincinnati, 1957; M.S., University of Illinois, 1959; Ph.D., 1961.
- HUMMEL, James A., Professor of Mathematics  
B.S., California Institute of Technology, 1949; M.A., Rice Institute, 1953; Ph.D., 1955.
- HUMPHREY, Philip S., Research Professor of Zoology  
B.A., Amherst College, 1949; M.S., University of Michigan, 1951; Ph.D., 1955.
- HUNT, Lois T., Instructor of Zoology  
B.A., University of Kansas, 1958; M.S., University of Washington, 1961.
- HURWITZ, Peter Alan, Research Associate in Chemistry  
B.S., Massachusetts Institute of Technology, 1961; M.S., Brandeis University, 1964.
- HYAMS, Ivan J., Research Associate in Chemistry  
B.S., London University, 1961; Ph.D., 1964.
- IRWIN, Gabriele I., Instructor of Foreign Languages  
Arbitur, Bavink Gymnasium, 1959.
- ISAACS, Ernest J., Lecturer in History  
B.A., University of Colorado, 1951; M.S., University of Wisconsin, 1957.
- IWRY, Samuel, Visiting Professor of Foreign Languages  
Ph.D., The Johns Hopkins University, 1951.
- JACHOWSKI, Leo A., Jr., Associate Professor of Zoology  
B.S., University of Michigan, 1941; M.S., 1942; Sc.D., The Johns Hopkins University, 1953.
- JACKSON, Stanley B., Professor of Mathematics  
B.A., Bates College, 1933; M.A., Harvard University, 1934; Ph.D., 1937.
- JACOBS, Judith E., Instructor of Foreign Languages  
B.A., Bryn Mawr College, 1962.
- JAMES, Edward F., Instructor of English  
B.A., University of Maryland, 1954; M.A., 1955.

- JAMIESON, Mitchell, Assistant Professor of Art  
Corcoran School of Art, 1940.
- JANES, Robert W., Professor of Sociology  
B.A., University of Chicago, 1938; M.A., 1939; Ph.D., University of Illinois, 1942.
- JAUQUITH, Richard H., Professor of Chemistry  
B.S., University of Massachusetts, 1940; M.S., 1942; Ph.D., Michigan State University, 1955.
- JASHEMSKI, Wilhelmina, Professor of History  
B.A., York College, 1931; M.A., University of Nebraska, 1933; Ph.D., University of Chicago, 1942.
- JELLEMA, Roderick H., Assistant Professor of English  
B.A., Calvin College, 1951; Post Graduate Diploma, University of Edinburgh, 1954; Ph.D., 1962.
- JOHNSON, Cecile Juliette, Lecturer in Foreign Languages  
M.A., The Johns Hopkins University, 1934.
- JOHNSON, Janet W., Assistant Professor of Psychology  
A.B., George Washington University, 1951; A.M., 1956; Ph.D., 1962.
- JOHNSON, Jerry K., Instructor of English  
B.A., Washington University, 1956; M.A., 1963.
- JOHNSON, Roy Hamlin, Associate Professor of Music  
B.Mus., Eastman School of Music, 1949; M.Mus., 1951; D.M.A., 1960.
- JOHNSON, William H., Instructor of Foreign Languages  
B.A., Princeton University, 1956; M.A., Cornell University, 1962.
- JONES, Arthur R., Jr., Assistant Professor of Sociology  
B.A., Louisiana State University, 1959; M.A., 1962; Ph.D., 1964.
- JONES, Derek, Post-Doctoral Fellow in Chemistry  
B.Sc., University College of Swansea, 1962; Ph.D., 1965.
- JONES, Donald G., Research Associate in Chemistry  
B.A., Washington Missionary College, 1957; Ph.D., University of Maryland, 1961.
- JONES, Edward T., Instructor of English  
B.A., Juniata College, 1960; M.A., University of Maryland, 1963.
- JONES, George F., Professor of Foreign Languages  
A.B., Emory University, 1938; M.A., Oxford University, 1943; Ph.D., Columbia University, 1951.
- JURAN, Sylvia L., Instructor of Foreign Languages  
B.A., University of Minnesota, 1951; M.A., Columbia University, 1961.
- KACSER, Claude, Assistant Professor of Physics  
B.A., Oxford University, 1955; M.A., 1959; Ph.D., Magdalen College, 1959.

## FACULTY

- KANSTOROOM, Emily S., Instructor of Speech  
B.A., University of Maryland, 1960; M.A., 1962.
- KARP, Carol R., Associate Professor of Mathematics  
B.A., Manchester College, 1948; M.A., Michigan State University, 1950; Ph.D. University of Southern California, 1959.
- KARR, Judith, Instructor of English  
B.A., University of Maryland, 1957; M.A., 1962.
- KASLER, Franz J., Associate Professor of Chemistry  
Doktorandum, University of Vienna, 1956; Ph.D., 1959.
- KAUFMAN, Thomas S., Instructor of Zoology  
B.A., University of Akron, 1961; M.S., University of Maryland, 1965.
- KAUFMAN, Tohko Y., Research Associate in Zoology  
B.A., Tsuda College (Tokyo), 1940; M.S., Hebrew University (Jerusalem), 1955; Ph.D., University of Munich, 1960.
- KEHOE, Brandt, Assistant Professor of Physics  
B.A., Cornell University, 1956; M.S., University of Wisconsin, 1959; Ph.D., 1962.
- KELLER, Edward C., Jr., Assistant Professor of Zoology  
B.S., Pennsylvania State University, 1956; M.S., 1959; Ph.D., 1961.
- KELLY, Vincent B., Assistant Professor of Foreign Languages  
B.A., Manhattan College, 1955; M.A., Hunter College, 1958; B.L., Universidad de San Marco, 1960; M.A.T., Indiana University, 1963; Ph.D., 1965.
- KEMNER, Margarethe M., Instructor of Foreign Languages  
Abitur, Annette-v.-Droste Hulshoff Munster, 1944; M.A., University of Detroit, 1954; M.A., University of Oklahoma, 1962.
- KENNETT, Lee, Assistant Professor of History  
B.A., University of North Carolina, 1952; M.A., University of Mississippi, 1956; Ph.D., University of Virginia, 1962.
- KENNEY, Blair Gates, Assistant Professor of English  
B.A., Vassar College, 1955; Ph.D., Radcliffe-Harvard, 1961.
- KILBOURN, George L., Jr., Instructor of Mathematics  
B.E., Yale University, 1954; B.S., 1950.
- KIM, Jung Soo, Reserach Associate in Mathematics  
B.S., Seoul National University, 1949; M.A., University of Maryland, 1961; Ph.D., 1962.
- KIM, Young Suh, Assistant Professor of Physics  
B.S., Carnegie Institute of Technology, 1958; Ph.D., Princeton University, 1961.
- KINNAIRD, John William, Assistant Professor of English  
B.A., University of California (Berkeley), 1944; M.A., Columbia University, 1949; Ph.D., 1959.

## FACULTY

- KIRWAN, William E., Assistant Professor of Mathematics  
A.B., University of Kentucky, 1960; M.S., Rutgers University, 1962; Ph.D., 1964.
- KISTLER, Robert C., Instructor of Sociology  
B.A., Southern Missionary College, 1948; M.A., Andrews University, 1960.
- KLABOE, Peter, Research Assistant in Chemistry  
Cand.Mag., University of Oslo, 1952; Cand. Real., 1956; Ph.D., University of Oklahoma, 1960.
- KLEPPNER, Adam, Associate Professor of Mathematics  
B.S., Yale University, 1953; M.A., University of Michigan, 1954; Ph.D., Harvard University, 1960.
- KNOCHE, Walter, Instructor of Foreign Languages  
B.A., Marquette University, 1961; M.A., Ohio State University, 1963; Ph.D., 1964.
- KNOPFEL, Hanspeter, Research Associate in Chemistry  
Ph.D., Federal Institute of Technology (Zurich), 1963.
- KOCH, Adrienne, Professor of History  
B.A., Washington Square College, New York University, 1933; M.A., Columbia University, 1934; Ph.D., 1942.
- KOCH, John Frederick, Assistant Professor of Physics  
B.A., New York University, 1958; Ph.D., University of California (Berkeley), 1962.
- KOLB, John R., Assistant Instructor of Mathematics  
A.A., Frostburg State Teachers College, 1959; A.B., University of Maryland, 1961.
- KOMESAROFF, Max Myer, Visiting Associate Research Professor of Astronomy  
B.Sc., University of Melbourne, 1953.
- KOR, Sushil K., Research Associate in Chemistry  
B.Sc., University of Allahabad, 1952; M.S., 1955; Ph.D., 1957.
- KORENMAN, Victor, Research Associate in Physics  
B.A., Princeton University, 1958; A.M., Harvard University, 1959; Ph.D., 1965.
- KOZAKOFF, Emily G., Instructor of Mathematics  
B.S., University of Miami, 1960; M.S., 1961.
- KRESS, Jerry R., Lecturer in Philosophy  
B.A., Pacific Lutheran University, 1961; M.A., University of Michigan, 1962.
- KRISHER, Lawrence C., Assistant Professor of Molecular Physics  
A.B., Syracuse University, 1955; A.M., Harvard University, 1957; Ph.D., 1959.
- KUNZE, Hans-Joachim D., Research Associate in Physics  
Diplom-Physiker, Technische Hochschule, 1961; Ph.D., 1964.
- KURODA, Sigekatu, Professor of Mathematics  
B.S., University of Tokyo, 1928; D.Sc., University of Tokyo, 1945.

## FACULTY

LAFFER, Norman C., Professor of Microbiology and Assistant Dean of the College of Arts and Sciences

B.S., Allegheny College, 1929; M.S., University of Maine, 1932; Ph.D., University of Illinois, 1937.

LAKSHMANAN, Sitarama, Assistant Professor of Chemistry

B.A., Annamalai University (India), 1946; M.A., 1949; Ph.D., University of Maryland, 1954.

LAND, Aubrey C., Professor of History

B.Ed., Southern Illinois University, 1934; M.A., State University of Iowa, 1938; Ph.D., 1948.

LANDON, Philip J., Instructor of English

B.A., University of Massachusetts, 1956; M.A., University of Maryland, 1964.

LANE, Richard M., Instructor of Zoology

B.S., Loyola College (Baltimore), 1959; M.S., University of Maryland, 1964.

LASTER, Howard J., Professor and Head of Physics and Astronomy

A.B., Harvard University, 1951; Ph.D., Cornell University, 1957.

LAWSON, Lewis A., Assistant Professor of English

B.S., East Tennessee State College, 1957; M.A., 1959; Ph.D., University of Wisconsin, 1964.

LEHNER, Guydo R., Associate Professor of Mathematics

B.S., Loyola University, 1951; M.S., University of Wisconsin, 1953; Ph.D., 1958.

LEHNER, Joseph, Professor of Mathematics

B.S., New York University, 1938; M.A., University of Pennsylvania, 1939; Ph.D., 1941.

LEIBOWITZ, Jack R., Assistant Professor of Physics

B.A., New York University, 1951; M.S., 1953; Ph.D., Brown University, 1962.

LEJINS, Peter P., Professor of Sociology

Magister Philosophiae, University of Latvia, 1930; Magister Iuris, 1933; Ph.D., University of Chicago, 1938.

LEMAIRE, Leo R., Instructor of Foreign Languages

Abitur, Hüssel Realgymnasium, 1926.

LEMBACH, John, Professor of Art

B.A., University of Chicago, 1934; M.A., Northwestern University, 1937; Ed.D., Columbia Teachers College, 1946.

LENCEK, Allen Martin, Assistant Professor of Physics

B.S., University of Chicago, 1957; Ph.D., University of Maryland, 1962.

LEPSON, Inda, Instructor of Mathematics

B.A., New York University, 1941; M.A., Columbia University, 1945.

LEVITINE, George, Professor and Head of Art

M.A., Boston University, 1946; Ph.D., Harvard University, 1952.

- LINCKE, Reimer P. H.**, Research Associate in Physics  
Vordiplom, Kiel University, 1957; M.S., University of Maryland, 1959; Ph.D., 1965.
- LINDER, Harris J.**, Associate Professor of Zoology  
B.S., Long Island University, 1951; M.S., Cornell University, 1955; Ph.D., 1958.
- LINKOW, Irving**, Associate Professor of Speech and Dramatic Art  
B.A., University of Denver, 1937; M.A., 1938.
- LIPPINCOTT, Ellis R.**, Professor of Chemistry  
B.A., Earlham College, 1943; M.S., The Johns Hopkins University, 1944; Ph.D., 1947.
- LOGAN, Terence P.**, Lecturer in English  
B.A., Boston College, 1959; M.A., University of Wisconsin, 1961.
- LONGLEY, E. L., Jr.**, Assistant Professor of Art and Education  
B.A., University of Maryland, 1950; M.A., Columbia University, 1953.
- LOUNSBURY, Myron O.**, Lecturer in English  
B.A., Duke University, 1961; M.A., University of Pennsylvania, 1962.
- LUNDSTROM, Margit**, Instructor of Music  
B.A., Columbia Union College, 1964; M.Mus., University of Maryland, 1965.
- LUTWACK, Leonard I.**, Associate Professor of English  
B.A., Wesleyan University, 1939; M.A., 1940; Ph.D., Ohio State University, 1950.
- MacDONALD, William M.**, Professor of Physics  
B.A., University of Pittsburgh, 1950; Ph.D., Princeton University, 1955.
- MAC QUILLAN, Anthony M.**, Assistant Professor of Microbiology  
B.S.A., University of British Columbia, 1956; M.S., 1958; Ph.D., University of Wisconsin, 1962.
- MACRO, Anthony David**, Instructor of Classical Languages  
B.A., Oxford University, 1961; M.A., 1964.
- MAIN, Jackson T.**, Visiting Professor of History  
B.A., University of Wisconsin, 1939; M.A., 1940; Ph.D., 1949.
- MALTESE, George J.**, Assistant Professor of Mathematics  
B.A., Wesleyan University, 1953; Ph.D., Yale University, 1960.
- MANNING, Charles**, Professor of English and Dean of the College of Arts and Sciences  
B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.
- MAR, Shuh-yin**, Instructor of Mathematics  
B.A., Ginling College (Nanking), 1928; M.S., Mount Holyoke College, 1932.
- MARIL, Herman**, Professor of Art  
Graduate, Maryland Institute of Fine Arts, 1928.

## FACULTY

MARION, Jerry B., Professor of Physics

B.A., Reed College, 1952; M.S., Rice Institute, 1953; Ph.D., 1955.

MARSHALL, Joseph A., Instructor of Zoology

B.S., University of Maryland, 1960.

MARTENS, Henrik H., Visiting Associate Professor of Mathematics

B.S.E.E., Cooper Union School of Engineering, 1956; Ph.D., New York University, 1962.

MARTIN, Minerva L., Assistant Professor of English

B.A., University of Alabama, 1931; M.A., Louisiana State University, 1937; Ph.D., 1940.

MARTIN, Monroe H., Professor of Mathematics

B.S., Lebanon Valley College, 1928; Ph.D., The Johns Hopkins University, 1932.

MASON, Edward A., Professor of Molecular Physics

B.S., Virginia Polytechnic Institute, 1947; Ph.D., Massachusetts Institute of Technology, 1951.

MATOSSIAN, Mary Kilbourne, Lecturer in History

B.A., Stanford University, 1951; M.A., American University (Beirut), 1952; Ph.D., Stanford University, 1955.

MAYOR, John R., Professor of Mathematics

B.S., Knox College, 1928; M.A., University of Illinois, 1929; Ph.D., University of Wisconsin, 1933.

McCAIN, Raymond R., Instructor of Speech and Dramatic Art

B.A., Louisiana State University, 1961; M.A., 1962.

McCLAY, Mary B., Instructor of Mathematics

B.Ed., Eastern Illinois State Teachers College, 1937; M.S., University of Illinois, 1941.

McCLELLAND, Louise, Assistant Professor of Music

B.A., College of Wooster, 1957; M.A., Columbia University, 1959; Diploma, Vienna State Academy of Music, 1963.

McCORKLE, Donald M., Professor of Music

B.Mus., Bradley University, 1951; M.A., Indiana University, 1953; Ph.D., 1958.

McCRORY, Raymond M., Lecturer in Chemistry

B.S., University of Texas, 1955; Ph.D., 1962.

McDONALD, Frank B., Professor of Physics

B.S., Duke University, 1948; M.S., University of Minnesota, 1952; Ph.D., 1955.

McGINNIES, Elliott M., Professor of Psychology

B.A., University of Buffalo, 1943; M.A., Brown University, 1944; Ph.D., Harvard University, 1948.

## FACULTY

McGUINNESS, David J., Assistant Professor of Mathematics

B.S., Worcester Polytechnic Institute, 1962; M.S., Case Institute of Technology, 1964; Ph.D., 1965.

McINTIRE, Roger W., Assistant Professor of Psychology

B.A., Northwestern University, 1958; M.A., Louisiana State University, 1960; Ph.D., 1962.

McINTOSH, Allen, Research Associate in Zoology

B.S., Mississippi A & M College, 1920; M.S., University of Minnesota, 1927; D.Sc., University of Miami, 1959 (Honorary).

McLAUGHLIN, Patricia J., Instructor of Zoology

B.A., Gettysburg College, 1956; M.S., University of Washington, 1961.

McMANAWAY, James G., Professor of English

B.A., University of Virginia, 1919; M.A., 1920; Ph.D., The Johns Hopkins University, 1931.

McMILLAN, Douglas J., Assistant Professor of English

B.A., DePaul University, 1954; M.A., University of Maryland, 1960; Ph.D., 1963.

MEERSMAN, Roger L., Assistant Professor of Speech and Dramatic Art

B.A., St. Ambrose College, 1952; M.A., University of Illinois, 1959; Ph.D., 1962.

MENDELOFF, Henry, Associate Professor of Foreign Languages

B.S., College of the City of New York, 1936; M.S., 1939; Ph.D., The Catholic University of America, 1960.

MENSER, Betty C., Instructor of Speech and Dramatic Art

B.A., Allegheny College, 1955; M.A., University of Pittsburgh, 1958.

MERRILL, Horace S., Professor of History

B.E., River Falls State College, 1932; Ph.M., University of Wisconsin, 1933; Ph.D., 1942.

MEYER, Charlton, Assistant Professor of Music

B.Mus., Curtis Institute, 1952.

MEYER, Henri P., Instructor of Foreign Languages

B.A., Wooster College, 1954; M.A., University of Maryland, 1962.

MIKULSKI, Piotr W., Assistant Professor of Mathematics

M.S., Main School of Planning and Statistics (Warsaw), 1952; Ph.D., University of California (Berkeley), 1961.

MILANS, Everett D., Assistant Instructor of Mathematics

A.B., George Washington University, 1936; A.M., 1947.

MILLER, Robert L., Assistant Professor of Foreign Languages

B.A., Wayne State University, 1952; M.A., University of Michigan, 1954; Ph.D., 1963.

MILLER, Russell H., Instructor of English

B.A., Pennsylvania State University, 1962; M.A., University of Maryland, 1965.

## FACULTY

MISH, Charles C., Professor of English

B.A., University of Pennsylvania, 1936; M.A., 1946; Ph.D., 1951.

MISNER, Charles W., Associate Professor of Physics

B.S., University of Notre Dame, 1952; M.A., Princeton University, 1954; Ph.D., 1957.

MOELLER, Hans-Berhard, Assistant Professor of Foreign Languages

B.A., Knox College, 1960; M.A., University of Southern California (Los Angeles), 1962; Ph.D., 1963.

MOLNAR, Eniko I., Instructor of English

B.A., Trinity College (Washington), 1962; M.A., University of North Carolina, 1963.

MONCAYO, Abelardo, Instructor of Foreign Languages

B.A., Colegio Americano de Quito, 1954; Licenciado, Central University of Ecuador, 1961.

MONTANO, Rocco, Professor of Comparative Literature and Italian

Dottore in Lettere e Filosofia, University of Naples, 1938.

MONTGOMERY, William L., Assistant Professor of Music

B.Mus.Ed., Cornell College, 1953; M.Mus., The Catholic University of America, 1957.

MOREINES, Harvey, Instructor of English

A.B., Brooklyn College, 1958; M.A., University of Maryland, 1962.

MORI, Yoshihiro, Research Associate in Chemistry

B.S., Nagoya University, 1953; Ph.D., 1955; D.Sc., Tokyo Institute of Technology, 1964.

MORRISON, Bruce, Instructor of Music

B.Mus.Ed., Northwestern University, 1959; M.Mus., 1960.

MORSE, Douglass H., Research Associate in Zoology

B.S., Bates College, 1960; M.S., University of Michigan, 1962; Ph.D., Louisiana State University, 1965.

MOTTA, Mary Carmel, Instructor of Foreign Languages

B.A., Rosary College, 1960; M.A., Middlebury College, 1963.

MOTZ, Annabelle B., Assistant Professor of Sociology

B.A., University of Wisconsin, 1941; M.A., University of Chicago, 1943; Ph.D., 1950.

MOZDZEN, Birgit E., Instructor of Zoology

B.S., University of Illinois, 1961; M.S., University of Maryland, 1964.

MURPHY, Charles D., Professor and Head of English

B.A., University of Wisconsin, 1929; M.A., Harvard University, 1930; Ph.D., Cornell University, 1940.

- MUSEN, Peter, Professor of Physics and Astronomy  
Mathematics, University of Belgrade, 1935; Ph.D., 1937.
- MYERS, Ralph B., Professor of Physics  
B.A., Cornell University, 1934; M.A., 1935; Ph.D., 1937.
- MYERS, Robert Manson, Associate Professor of English  
B.A., Vanderbilt University, 1941; M.A., Columbia University, 1942; M.A., Harvard University, 1943; Ph.D., Columbia University, 1948.
- MYTON, Becky A. T., Instructor of Zoology  
B.S., Allegheny College, 1963; M.S., University of Maryland, 1965.
- NAGARAJAN, G., Research Associate in Chemistry  
B.S., St. Joseph's College (India), 1955; M.A., Annamali University, 1957; M.S., 1958; Ph.D., 1961.
- NANNEY, Thomas R., Visiting Assistant Professor in Chemistry  
B.S., University of North Carolina, 1953; Ph.D., University of South Carolina, 1962.
- NAVRATIL, Carol M., Instructor of Speech and Dramatic Art  
B.A., The Catholic University of America, 1960; M.A., University of Maryland, 1964.
- NELSON, Elizabeth J., Instructor of English  
B.A., University of Wisconsin, 1944; M.A., Mills College, 1949; M.A., University of Maryland, 1957.
- NEMES, Graciela P., Professor of Foreign Languages  
B.S., Trinity College (Vermont), 1942; M.A., University of Maryland, 1946; Ph.D., 1952.
- NIEMEYER, G. Charles, Associate Professor of Speech and Dramatic Art  
B.S., DePauw University, 1933; M.A., Northwestern University, 1935; Ph.D., Yale University, 1942.
- NIETO, Jose I., Assistant Professor of Mathematics  
M.S., National University of Colombia, 1956; Ph.D., University of Heidelberg, 1959.
- NOACK, Manfred G., Research Associate in Chemistry  
Intermediate Exam., Hochschule Munchen, 1959; Ph.D., Technische Hochschule Munchen, 1964.
- NORTON, Ann E., Assistant Professor of Foreign Languages and Assistant to the Dean of the College of Arts and Sciences  
B.A., Syracuse University, 1945; M.A., 1947.
- NOSSAMAN, Audrey, Assistant Professor of Music  
B.Mus., Westminster Choir College, 1947.
- O'BRIEN, Robert B., Assistant Professor of Psychology  
B.A., Ohio State University, 1949; M.A., Northwestern University, 1952; Ph.D., Wayne State University, 1965.
- O'CONNELL, George D., Assistant Professor of Art  
B.S., University of Wisconsin, 1950; M.S., 1951.

## FACULTY

- O'CONNOR, Francis V., Visiting Lecturer of Art  
B.A., Manhattan College, 1959; M.A., The Johns Hopkins University, 1960; Ph.D., 1964.
- OLSON, Orrin, Instructor of Music  
B.A., Sacramento State College, 1960; M.Mus., Indiana University, 1961.
- ONEDA, Sadao, Associate Professor of Physics  
B.Sc., Tokyo University, 1946; M.Sc., 1948; Ph.D., Nagoya University, 1953.
- OPIK, Ernst J., Professor of Physics and Astronomy  
Cand. Astro., Moscow Imperial University, 1916; D. Phil. Nat., University of Estonia, 1923.
- ORR, Robert H., Lecturer in English  
B.A., University of Alabama, 1958; M.A., Cornell University, 1961.
- OSBORN, John E., Assistant Professor of Mathematics  
B.S., University of Minnesota, 1958; M.S., 1963; Ph.D., 1965.
- OSTLING, Acton E., Jr., Assistant Professor of Music and Assistant Director of University Bands  
B. Mus., University of Michigan, 1958; M.Mus., 1959.
- PANICHAS, George A., Assistant Professor of English  
B.A., American International College, 1951; M.A., Trinity College (Connecticut), 1952; Ph.D., The University of Nottingham, 1961.
- PANICO, Marie J., Instructor of Foreign Languages  
B.A., Queens College, 1958; M.A., University of Maryland, 1960.
- PARSONS, Arthur C., Associate Professor and Acting Head of Foreign Languages  
B.A., University of Maryland, 1926; M.A., 1928.
- PATI, Jogesh, Assistant Professor of Physics  
I.Sc., Utkal University, 1953; B.Sc., Ravenshaw College, 1955; M.Sc., Delhi University, 1957; Ph.D., University of Maryland, 1960.
- PASCH, Alan, Associate Professor of Philosophy  
B.A., University of Michigan, 1949; M.A., New School for Social Reserach, 1952; Ph.D., Princeton University, 1955.
- PAYERLE, Laszlo, Instructor of Music  
B.Mus., University of Maryland, 1960; M.Mus., University of Texas, 1962.
- PEACH, Gillian, Research Associate in Physics  
B.Sc., Royal Holloway College, London University, 1957; Ph.D., 1960.
- PEARL, Martin M., Associate Professor of Mathematics  
B.A., Brooklyn College, 1950; M.A., University of Michigan, 1951; Ph.D., University of Wisconsin, 1955.
- PEARLMAN, Leonard, Visiting Assistant Professor of Music  
B.A., University of Manitoba, 1949; M.D., 1953; Diploma, Vienna State Academy of Music, 1956.

- PELCZAR, Michael J., Jr., Professor of Microbiology  
B.S., University of Maryland, 1936; M.S., 1938; Ph.D., State University of Iowa, 1941.
- PENNINGTON, Kenneth D., Assistant Professor of Music  
B.A., Friends University, 1949; B.Mus., 1950; M.A., New York University, 1953; D.Mus., Indiana University, 1961.
- PETRUCCI, Serigo, Visiting Research Assistant in Chemistry  
Licentiate Scientific Lyceum (Tripoli), 1949; D.Sc., University of Rome, 1954.
- PIAZZA, Richard M. D., Lecturer in History  
B.A., Brown University, 1959; M.A., Northwestern University, 1961.
- PICKARD, Hugh B., Associate Professor of Chemistry  
A.B., Haverford College, 1933; Ph.D., Northwestern University, 1938.
- PORTZ, John, Associate Professor of English  
B.S., Duke University, 1937; M.A., Harvard University, 1941; Ph.D., 1958.
- POTTER, Jane H., Assistant Professor of Zoology  
B.S., University of Chicago, 1942; M.S., 1948; Ph.D., 1949.
- POULAKIDAS, Andreas K., Instructor of English  
M.Th., National Capodestrian University (Athens), 1959; M.A., Arizona State University, 1962.
- POULTNEY, Sherman K., Research Associate in Physics  
B.S., Worcester Polytechnic Institute, 1958; M.A., Princeton University, 1960; Ph.D., 1962.
- POWNALL, George A., Assistant Professor of Sociology  
B.S., Illinois State Normal University, 1952; M.S., 1957; Ph.D., University of Illinois, 1963.
- PRAHL, A. J., Professor of Foreign Languages and Associate Dean of the Graduate School  
M.A., Washington University, 1928; Ph.D., The Johns Hopkins University, 1933.
- PRANGE, Gordon W., Professor of History  
B.A., University of Iowa, 1932; M.A., 1934; Ph.D., 1937.
- PRANGE, Richard E., Associate Professor of Physics  
M.S., University of Chicago, 1955; Ph.D., 1957.
- PRATT, Ernest F., Professor of Chemistry  
A.B., University of Redlands, 1937; M.S., Oregon State College, 1939; Ph.D., University of Michigan, 1942.
- PRATT, Yolanda Tota, Research Associate in Chemistry  
A.B., Cornell University, 1938; Ph.D., Columbia University, 1942.
- PRICE, James L., Assistant Professor of Sociology  
B.S., Ohio State University, 1950; M.A., University of Illinois, 1954; Ph.D., Columbia University, 1962.

## FACULTY

- PROVENSEN, Hester B., Assistant Professor of Speech and Dramatic Art  
LL.B., George Washington University, 1926; M.A., Emerson College, 1948.
- PUGH, Howel Griffith, Associate Professor of Physics  
B.A., University of Cambridge, 1955; M.A., 1961; Ph.D., 1961.
- PUGLIESE, Rudolph E., Associate Professor of Speech and Dramatic Art  
B.A., Miami University, 1947; M.A., The Catholic University of America, 1949;  
Ph.D., Ohio State University, 1961.
- PUMROY, Donald K., Associate Professor of Psychology  
B.A., University of Iowa, 1949; M.S., University of Wisconsin, 1951; Ph.D., University of Washington, 1954.
- PURDY, William C., Professor of Chemistry  
A.B., Amherst College, 1951; Ph.D., Massachusetts Institute of Technology, 1955.
- QUYNN, William R., Professor of Foreign Languages  
B.A., University of Virginia, 1922; M.A., 1923; Ph.D., The Johns Hopkins University, 1934.
- RABINOVITCH, Kopel, Research Associate in Physics  
M.Sc., The Hebrew University of Jerusalem, 1957; Ph.D., 1963.
- RADO, George T., Professor of Physics  
S.B., Massachusetts Institute of Technology, 1939; S.M., 1941; Ph.D., 1943.
- RAMM, Gordon M., Associate Professor of Zoology  
B.A., University of Buffalo, 1949; M.A., 1950; Ph.D., New York University, 1954.
- RAND, Marguerite C., Professor of Foreign Languages  
B.A., Pomona College, 1919; M.A., Stanford University, 1922; Ph.D., University of Chicago, 1951.
- REEVE, Wilkins, Professor of Chemistry  
B.S., Drexel Institute of Technology, 1936; Ph.D., University of Wisconsin, 1940.
- REINHART, Bruce L., Professor of Mathematics  
B.A., Lehigh University, 1952; M.A., Princeton University, 1954; Ph.D., 1956.
- RENTZ, Marie S., Instructor of Foreign Languages  
A.B., Woman's College, University of North Carolina, 1947; M.A., Duke University, 1951.
- RESAU, Robert D., Instructor of Zoology  
B.S., King's College (New York), 1963.
- RESNIKOFF, Marvin, Research Associate in Physics  
B.A., University of Michigan, 1959; M.S., 1961; Ph.D., 1965.
- RICHARD, Jean-Paul, Research Associate in Physics  
B.A., Université Laval, 1956; B.S., 1960; Ph.D., Université de Paris, 1963.

- RICHESON, Allie W.**, Professor of Mathematics  
B.S., University of Richmond, 1918; M.A., The Johns Hopkins University, 1925; Ph.D., 1928.
- RIVLIN, Helen A.**, Associate Professor of History  
B.A., University of Rochester, 1949; M.A., Radcliffe College, 1950; Ph.D., Oxford University, 1953.
- ROBERSON, Bob S.**, Assistant Professor of Microbiology  
B.A., University of North Carolina, 1951; Ph.D., 1960.
- ROBERTSON, J. Righton, Jr.**, Assistant Professor of History  
B.A., University of the South, 1954; M.A., Emory University, 1960; Ph.D., 1963.
- RODBERG, Leonard S.**, Associate Professor of Physics  
B.A., The Johns Hopkins University, 1954; Ph.D., Massachusetts Institute of Technology, 1956.
- RODGERS, Mary C.**, Assistant Professor of English  
B.A., Notre Dame College (Ohio), 1957; M.A., Western Reserve University, 1962; Ph.D., Ohio State University, 1964.
- RODRIGUEZ, Paul V.**, Instructor of Foreign Languages  
Bachiller, Instituto Hispano-Marroquí, 1934; Maestro de Primera Enseñanza, Escuela Normal de Melilla, 1941.
- ROELOFS, Charles R., Jr.**, Lecturer in Philosophy  
B.A., Ohio Wesleyan University, 1953; B.D., Yale University Divinity School, 1956; M.A., Harvard University, 1965.
- ROLLINSON, Carl L.**, Professor of Chemistry  
B.S., University of Michigan, 1933; Ph.D., University of Illinois, 1939.
- ROOS, Philip G.**, Visiting Assistant Professor of Physics  
B.A., Ohio Wesleyan University, 1960; Ph.D., Massachusetts Institute of Technology, 1964.
- ROSELLE, David P.**, Assistant Professor of Mathematics  
B.S., West Chester State College, 1961; Ph.D., Duke University, 1965.
- ROSENFELD, Maxine S.**, Assistant Instructor of Mathematics  
B.S., Wilson Teachers College, 1937.
- ROSENFELD, Leonora C.**, Associate Professor of Foreign Languages  
B.A., Smith College, 1930; M.A., Columbia University, 1931; Ph.D., 1940.
- ROSWELL, May M.**, Assistant Professor of Foreign Languages  
B.A., University of Dublin, 1936; M.A., University of Maryland, 1957; M.A., University of Dublin, 1958; Ph.D., University of Maryland, 1961.
- ROVNER, Philip**, Associate Professor of Foreign Languages  
B.A., The George Washington University, 1948; M.A., 1949; Ph.D., University of Maryland, 1958.

## FACULTY

RUBINSTEIN, Nathan, Assistant Instructor of Mathematics

B.S., Long Island University, 1959.

SADUM, Elvio H., Research Professor of Zoology

B.S., Livorno University, 1936; Bi.Med., Pisa University, 1939; M.A., Harvard University, 1942; Sc.D., The Johns Hopkins University, 1948.

SAENZ, Pilar G., Instructor of Foreign Languages

Licenciada en Filosofia y Letras, University of Madrid, 1953; M.A., Bryn Mawr College, 1957.

SAGLE, Arthur A., Associate Professor of Mathematics

B.S., University of Washington, 1956; M.S., 1957; Ph.D., University of California (Los Angeles), 1960.

SAIEDY, Fuad, Research Associate in Physics

B.Sc., London University, 1956; D.I.C., Imperial College, London University, 1957; Ph.D., 1960.

SALGADO, Maria A., Instructor of Foreign Languages

B.A., Florida State University, 1958; M.A., University of North Carolina, 1960.

SCHAEFER, Thomas R., Instructor of English

B.A., Beloit College, 1957; M.A., University of Wisconsin, 1960.

SCHAMP, Homer W., Jr., Professor and Director of Molecular Physics

A.B., Miami University, 1944; M.S., University of Michigan, 1947; Ph.D., 1952.

SCHAUMANN, Herbert, Assistant Professor of English

B.A., Westminster College, 1931; Ph.D., Cornell University, 1935.

SCHIRRMACHER, Mildred D., Assistant Instructor of Mathematics

B.A., University of Oklahoma, 1926; M.S., University of Chicago, 1929.

SCHLARETZKI, Walter E., Professor and Head of Philosophy

B.A., Monmouth College, 1941; M.A., University of Illinois, 1942; Ph.D., Cornell University, 1948.

SCHLESINGER, Sarah M., Instructor of Speech

B.A., University of Maryland, 1962; M.A., 1963.

SCHLIEDER, Siegfried, Visiting Assistant Professor of Physics

Vordiplom, Georg-August Universitat, 1950; Diplom, 1953; Doktor, 1959.

SCHMITT, Charles J., Assistant Professor of Speech and Dramatic Art

B.A., Montana State University, 1953; M.A., University of Wisconsin, 1956; M.F.A., 1959.

SCHMITTNER, Stella M., Assistant Professor of Zoology

B.S., Colorado College, 1957; M.S., University of Georgia, 1959; Ph.D., 1963.

SCHOENBORN, Henry W., Professor of Zoology

A.B., DePauw University, 1933; Ph.D., New York University, 1939.

- SCHROEDER, Rudolph A., Visiting Research Associate Professor of Chemistry  
B.S., North Dakota Agricultural College, 1952; M.S., 1953; Ph.D., University of Maryland, 1957.
- SEdgeWICK, Rose, Assistant Professor of Mathematics  
Ph.B., Brown University, 1925; M.A., 1927; Ph.D., 1929.
- SHANKWEILER, Paul W., Associate Professor of Sociology  
Ph.D., Muhlenberg University, 1919; M.A., Columbia University, 1921; Ph.D., University of North Carolina, 1934.
- SHANNON, David Allen, Professor and Head of History  
B.S., Indiana State Teachers College, 1941; Ph.M., University of Wisconsin, 1946; Ph.D., 1951.
- SHELLEY, Shirley J., Visiting Assistant Professor of Music and Music Education  
B.Mus., University of Michigan, 1944; M.Mus., 1947.
- SHEPHERD, Julius C., Assistant Professor of Mathematics  
A.B., East Carolina College, 1944; M.A., 1947.
- SIAHATGAR, Sedegh, Assistant Instructor of Mathematics  
B.S., Teheran Institute of Technology, 1956; M.S., 1961.
- SILBEY, Joel H., Assistant Professor of History  
B.A., Brooklyn College, 1955; M.A., University of Iowa, 1956; Ph.D., 1963.
- SINCLAIR, Alan Campbell E., Research Associate in Physics  
B.A., Cambridge University, 1961; Ph.D., Bristol University, 1965.
- SKIDMORE, William R., Instructor of Music  
B.Mus., University of Illinois, 1963.
- SLAWSKY, Zaka I., Professor of Physics  
B.S., Rensselaer Polytechnic Institute, 1933; M.S., California Institute of Technology, 1935; Ph.D., University of Michigan, 1938.
- SMITH, Charles W., Instructor of English  
B.S., Frostburg State Teachers College, 1957; M.A., University of Maryland, 1965.
- SMITH, Denzell S., Assistant Professor of English  
B.A., University of Minnesota, 1950; M.A., 1954; M.A., 1958; Ph.D., 1965.
- SMITH, Elske van Panhuys, Associate Professor of Astronomy  
A.B., Radcliffe College, 1950; A.M., 1951; Ph.D., 1955.
- SMITH, Gayle S., Associate Professor of English and Director of General Education  
B.S., Iowa State College, 1948; M.A., Cornell University, 1951; Ph.D., 1958.
- SMITH, Russell I., Assistant Instructor of Mathematics  
B.S., Ohio State University, 1933.
- SNOW, George A., Professor of Physics  
B.S., College of the City of New York, 1945; M.A., Princeton University, 1947; Ph.D., 1949.

## FACULTY

- SONNTAG, Guenter W., Instructor of Foreign Languages  
B.A., University of Maryland, 1960; M.A., 1962.
- SORENSEN, Shirley C., Instructor of Mathematics  
B.S., Wilson Teachers College, 1945.
- SPARKS, David S., Professor of History  
B.A., Grinnell College, 1944; M.A., University of Chicago, 1945; Ph.D., 1951.
- SPIVEY, Howard Olin, Assistant Professor of Chemistry  
B.S., University of Kentucky, 1954; M.A., Harvard University, 1956; Ph.D., 1963.
- SPRINGMANN, Fague K., Associate Professor of Music  
B. Mus., Westminster Choir College, 1939.
- SPROUT, Monique, Instructor of Foreign Languages  
B.A., University of Paris, 1946; B.A., Columbia Union College, 1956.
- SPUEHLER, Henry E., Lecturer in Speech and Dramatic Art  
B.S., Purdue University, 1953; M.A., 1954; Ph.D., 1956.
- STADTMAN, Earl R., Lecturer in Microbiology  
B.S., University of California (Berkeley), 1942; Ph.D., 1949.
- STALEY, Stuart W., Assistant Professor of Chemistry  
B.A., Williams College, 1959; M.S., Yale University, 1961; Ph.D., 1964.
- STARCHER, E. Thomas, Assistant Professor of Speech and Dramatic Art  
B.A., University of Southern California, 1940; M.A., University of Arkansas, 1948.
- STEELY, Lewis R., Assistant Instructor of Mathematics  
B.S., Wilson Teachers College, 1937; M.A., The Catholic University of America, 1945.
- STEINBERG, Phillip M., Associate Professor of Physics  
B.S., University of Cincinnati, 1954; Ph.D., Northwestern University, 1959.
- STEINMAN, Robert M., Assistant Professor of Psychology  
D.D.S., St. Louis University, 1948; M.A., New School for Social Research, 1962; Ph.D., 1964.
- STEINMETZ, Karl, Research Associate in Chemistry  
Dipl. Chem. Technische Hochschule Branschweig (Germany), 1961; Dr. rer. nat., 1963.
- STELLMACHER, Karl L., Professor of Mathematics  
M.D., University of Gottingen, 1933; Ph.D., 1936.
- STERN, Edward A., Professor of Physics  
B.S., California Institute of Technology, 1951; Ph.D., 1955.
- STERN, Monique, Instructor of Foreign Languages  
Licence-Des., University of Paris, 1962.

## FACULTY

- STEVENSON, Barbara H., Instructor of English  
B.A., University of California (Los Angeles), 1938; M.A., University of California (Berkeley), 1939.
- STEWART, Bernice C., Instructor of Zoology  
B.S., Lewis and Clark College, 1949; M.S., University of Seattle, 1952.
- STEWART, James M., Associate Professor of Chemistry  
B.A., Western Washington College, 1953; Ph.D., University of Washington, 1958.
- STITES, M. Elizabeth, Assistant Professor of Art  
B.Arch., New York University, 1940.
- STONE, Martha C., Instructor of English  
B.S., Southeast Missouri State College, 1927; M.A., University of Missouri, 1929.
- STRAUSBAUGH, Warren L., Professor and Head of Speech and Dramatic Art  
B.S., Wooster College, 1932; M.A., State University of Iowa, 1935.
- STRAUSS, Aaron S., Assistant Professor of Mathematics  
B.S., Case Institute of Technology, 1961; M.S., University of Wisconsin, 1962; Ph.D., 1964.
- STROMBERG, Roland N., Professor of History  
B.A., University of Kansas City, 1939; M.A., The American University, 1945; Ph.D., University of Maryland, 1952.
- STROSS, Raymond G., Associate Professor of Zoology  
B.S., University of Missouri, 1952; M.S., University of Idaho, 1954; Ph.D., University of Wisconsin, 1958.
- STUNTZ, Calvin F., Associate Professor of Chemistry  
B.A., University of Buffalo, 1939; Ph.D., 1947.
- SUCHER, Joseph, Professor of Physics  
B.S., Brooklyn College, 1952; Ph.D., Columbia University, 1958.
- SULLIVAN, Noreen, Instructor of Art  
B.A., Trinity College, 1958; M.A., Northwestern University, 1963.
- SUSZYNSKI, Olivia C., Instructor of Foreign Languages  
B.A., Hunter College, 1953; M.A., New York University, 1955.
- SVIRBELY, William J., Professor of Chemistry  
B.S., Carnegie Institute of Technology, 1931; M.S., 1932; D.Sc., 1935.
- SYSKI, Ryszard, Associate Professor of Mathematics  
B.S., University of London, 1954; Ph.D., Chelsea College, 1960.
- TATNALL, Anne, Instructor of Music  
B.A., University of Delaware, 1961; M.A., Smith College, 1963.
- TEWARI, Paramhans, Research Associate in Chemistry  
M.S., Lucknow University, 1952; Ph.D., 1957.

## FACULTY

THORBERG, Raymond, Associate Professor of English

B.A., University of Alaska, 1939; M.A., University of Chicago, 1946; Ph.D., Cornell University, 1954.

TOLAND, John I., Instructor of Sociology

B.A., University of Tulsa, 1956; M.A., University of Maryland, 1958.

TRAYER, Paul, Assistant Professor of Music

B.Mus., The Catholic University of America, 1955; M.Mus., 1957.

TRIMBLE, Lester, Professor of Music

B.A., Carnegie Institute of Technology, 1947; M.F.A., 1948.

TROUSDALE, Marion S., Instructor of English

B.A., University of Michigan, 1951; M.A., University of California (Berkeley), 1955.

TULLEY, Patricia, Assistant Professor of Mathematics

A.B., Vassar College, 1955; M.S., University of Wisconsin, 1958; Ph.D., 1962.

TUNIKS, Galina, Instructor of Foreign Languages

B.S.L., Georgetown University, 1954.

TURNAGE, Thomas W., Assistant Professor of Psychology

A.B., University of California (Berkeley), 1958; Ph.D., 1962.

TURNER, David J., Research Associate in Chemistry

B.S., University of London, 1958; Ph.D., 1962.

ULRICH, Homer, Professor and Head of Music

M.A., University of Chicago, 1939.

URBANSKI, Tadeusz, Visiting Professor of Chemistry

M.S., Institute of Technology Politechnika (Poland), 1924; Ph.D., 1932; D.Sc., 1933; NSF Senior Foreign Scientist Fellow.

VANDERSLICE, Betty R., Instructor of Mathematics

B.A., Upsilon College, 1945; M.A., University of Maryland, 1948.

VANDERSLICE, Joseph T., Professor of Molecular Physics

B.S., Boston College, 1949; Ph.D., Massachusetts Institute of Technology, 1953.

VAN NESS, James S., Instructor of History

B.A., University of Maryland, 1954; M.A., 1962.

VAN WIJK, Uco, Associate Professor of Physics and Astronomy

B.S., Harvard University, 1948; Ph.D., 1952.

VARNEDOE, Samuel L., Jr., Lecturer in Philosophy

B.A., University of North Carolina, 1959; M.A., New School for Social Research, 1962.

VASSYLKIVSKY, Eugenia, Assistant Professor of Foreign Languages

B.S., Columbia University, 1954; M.A., 1958; Ph.D., 1964.

- VEITCH, Fletcher P., Professor of Chemistry  
B.S., University of Maryland, 1931; M.S., 1933; Ph.D., 1935.
- VETTER, Harold J., Assistant Professor of Psychology  
B.A., University of Buffalo, 1949; M.A., 1952; Ph.D., 1955.
- VOGELGESAND, Ernst, Assistant Professor of Foreign Languages  
Abitur, Oberschule Aschaffenburg, 1951; M.A. equivalent, Tulane University, 1962.
- WALBESSER, Henry H., Assistant Professor of Mathematics  
B.A., State University of New York, 1950; M.A., University of Maryland, 1960; Ph.D., 1965.
- WALDER, Leopold O., Associate Professor of Psychology  
A.B., Boston University, 1949; M.A., University of Hawaii, 1951; Ph.D., University of Iowa, 1954.
- WALDROP, Robert S., Professor of Psychology  
B.A., University of Oklahoma, 1934; Ph.D., University of Michigan, 1948.
- WALL, Nathan Saunders, Associate Professor of Physics  
B.S., Rensselaer Polytechnic Institute, 1949; Ph.D., Massachusetts Institute of Technology, 1954.
- WALSH, Joseph Leonard, Professor of Mathematics  
B.S., Harvard University, 1916; M.S., University of Wisconsin, 1917; Ph.D., Harvard University, 1920.
- WALT, James, Instructor of English  
B.A., University of Minnesota, 1936; M.A., University of Michigan, 1937; Ph.D., 1955.
- WARD, Charles D., Assistant Professor of Psychology  
B.A., Pomona College, 1958; M.A., University of North Carolina, 1962; Ph.D., 1963.
- WARD, Kathryn M. Painter, Associate Professor of English  
B.A., The George Washington University, 1935; M.A., 1936; Ph.D., 1947.
- WARNER, Charles R., Assistant Professor of Mathematics  
B.A., University of Toronto, 1955; M.S., University of Rochester, 1957; Ph.D., 1962.
- WEBER, Joseph, Professor of Physics  
B.S., United States Naval Academy, 1940; Ph.D., The Catholic University of America, 1951.
- WEBER, Kurt, Associate Professor of English  
B.A., Williams College, 1930; B.A., Oxford University, 1932; M.A., Columbia University, 1933; Ph.D., 1940.
- WEAVER, Carl H., Associate Professor of Speech and Dramatic Art  
B.A., Bluffton College, 1936; M.A., Ohio State University, 1950; Ph.D., 1957.

## FACULTY

WEGIMONT, Pierre, Instructor of Foreign Languages

B.A., Faculte Notre-Dame de la Paix, 1948; Docteur en droit, Universite Libre de Bruxelles, 1962.

WEINSTEIN, Allen, Lecturer in History

B.A., City College of New York, 1960; M.A., Yale University, 1962.

WESTERHOUT, Gert, Professor of Physics and Astronomy and Director of Astronomy

B.S., University of Leiden, 1950; M.S., 1954; Ph.D., 1958.

WHALEY, Betty F., Instructor of English

B.A., University of North Carolina, 1942; M.A., University of Maryland, 1961.

WHATLEY, Linda S., Research Assistant Professor in Chemistry

B.A., Newcomb College, Tulane University, 1957; Ph.D., University of Wisconsin, 1962.

WHATLEY, Malcolm C., Assistant Professor of Physics

B.S., Southwestern University, 1956; M.S., University of Wisconsin, 1958; Ph.D., 1962.

WHITE, Charles E., Professor and Head of Chemistry

B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.

WHITE, John Arnold, Research Associate in Physics

B.A., Oberlin College, 1954; M.S., Yale University, 1955; Ph.D., 1959.

WHITLEY, Robert J., Assistant Professor of Mathematics

B.A., San Diego State College, 1959; M.S., 1961; Ph.D., New Mexico State University, 1964.

WIEMAN, Robert M., Visiting Associate Professor of Philosophy

B.A., Central Methodist College, 1942; M.A., University of California, 1947; Ph.D., 1955.

WILAN, Richard A., Instructor of English

B.A., Amherst College, 1957; A.M.T., Harvard University, 1958.

WILLIAMS, Aubrey W., Jr., Assistant Professor of Sociology

B.A., University of North Carolina, 1955; M.A., 1957; Ph.D., University of Arizona, 1964.

WILLKE, Thomas A., Assistant Professor of Mathematics

A.B., Xavier University, 1954; M.S., Ohio State University, 1956; Ph.D., 1960.

WILLOTT, W. Brian, Research Associate in Physics

B.A., Cambridge University, 1961; M.A., 1965; Ph.D., 1965.

WILSON, Gayle E., Assistant Professor of English

B.A., Wayne State University, 1960; M.A., University of Rochester, 1963; Ph.D., 1965.

WILTS, Ommo, Instructor of Foreign Languages

M.A., equivalent, University of Kiel, 1965; Ph.D., 1965.

## FACULTY

- WOLFE, G. Joseph, Assistant Professor of Speech and Dramatic Art  
B.S., Eastern Illinois University, 1955; M.A., State University of Iowa, 1959;  
Ph.D., 1964.
- WOO, Ching-Hung, Assistant Professor of Physics  
B.S., Louisiana Technological Institute, 1958; M.S., University of California  
(Berkeley), 1959; Ph.D., 1962.
- WOODS, Edward James, Assistant Professor of Physics  
B.Sc., Queen's University, 1957; Ph.D., Princeton University, 1962.
- WOODS, G. Forrest, Professor of Chemistry  
B.S., Northwestern University, 1934; B.A., 1935; M.S., Harvard University, 1937;  
Ph.D., 1940.
- WRIGHT, William C, Instructor of English  
B.A., University of Maryland, 1958.
- YANEY, George L., Assistant Professor of History  
B.Mgt.E., Rensselaer Polytechnic Institute, 1952; M.A., University of Colorado,  
1956; Ph.D., Princeton University, 1961.
- YARCZOWER, Matthew, Associate Professor of Psychology.  
B.B.A., College of the City of New York, 1953; M.A., University of Maryland,  
1955; Ph.D., 1958.
- YODH, Gaurang B., Professor of Physics  
B.Sc., University of Bombay, 1948; M.Sc., University of Chicago, 1951; Ph.D.,  
1955.
- YOUNG, Frank C., Visiting Assistant Professor of Physics  
B.A., The Johns Hopkins University, 1957; Ph.D., University of Maryland, 1962.
- ZAPOLSKY, Harold D., Assistant Professor of Physics  
B.A., Shimer College, University of Chicago, 1954; Ph.D., Cornell University,  
1962.
- ZEDEK, Mishael, Associate Professor of Mathematics  
M.S., Hebrew University (Jerusalem), 1952; Ph.D., Harvard University, 1956.
- ZEEVELD, W. Gordon, Professor of English  
B.A., University of Rochester, 1924; M.A., The Johns Hopkins University, 1929;  
Ph.D., 1936.
- ZEMEL, Jacqueline, Instructor of Mathematics  
B.S., Queen's College, 1949; M.A., Syracuse University, 1951.
- ZIMMERMAN, Melvin, Assistant Professor of Foreign Languages  
B.S.S., City College of New York, 1950; Master of Foreign Studies, University of  
Maryland (Paris), 1958; Ph.D., University of Wisconsin, 1964.
- ZIPOY, David M., Associate Professor of Physics  
B.S., University of Minnesota, 1954; Ph.D., 1957.

## FACULTY

ZORN, Bice Sechi, Research Assistant Professor in Physics

Dottore in Fisica, Università di Cagliari, 1951.

ZORN, Gus Tom, Associate Professor of Physics

B.S., Oklahoma State University, 1948; M.S., University of New Mexico, 1953;  
Ph.D., University of Padua, 1954.













*CATALOG OF THE*  
COLLEGE OF  
BUSINESS AND  
PUBLIC  
ADMINISTRATION  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*January 7, 1966*

*Number 13*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Re-entered at the Post Office at College Park, Maryland, as second class mail matter under the Act of Congress on August 24, 1912. Published twenty-nine times.



# Contents

## GENERAL

University Calendar . . . . .	iv	Degrees . . . . .	3
Board of Regents . . . . .	vi	Graduation Requirement . . . . .	3
Officers of Administration . . . . .	vii	Junior Standing . . . . .	3
Chairmen, Standing Committees, Faculty Senate . . . . .	xi	Senior Residence Requirement . . . . .	4
The College . . . . .	1	Air Science Instruction . . . . .	4
Organization . . . . .	1	Costs . . . . .	4
Academic Information . . . . .	2	Admission . . . . .	5
General Information . . . . .	2	Honors, Awards and Scholarships . . . . .	6

## CURRICULA AND REQUIRED COURSES

I. Business Administration . . . . .	9	II. Economics . . . . .	29
The General Curriculum in Administration . . . . .	11	III. Geography . . . . .	38
Accounting . . . . .	12	IV. Government and Politics . . . . .	49
Finance . . . . .	13	V. Journalism and Public Relations . . . . .	60
Insurance and Real Estate . . . . .	14	VI. Information Systems Management . . . . .	57
Marketing . . . . .	14	VII. Bureau of Business and Economic Research . . . . .	65
Personnel and Industrial Relations . . . . .	15	VIII. Bureau of Governmental Research . . . . .	65
Production Management . . . . .	16	IX. Affiliated Governmental Organizations . . . . .	66
Statistics . . . . .	17	1. Maryland County Commissioners Association . . . . .	66
Transportation . . . . .	18	2. Maryland Municipal League . . . . .	66
Combined Business Administration and Law Program . . . . .	19		
Master of Business Administration . . . . .	19		

## COURSE OFFERINGS

Business Administration . . . . .	20	Journalism and Public Relations . . . . .	61
Economics . . . . .	31	Information Systems Management . . . . .	58
Geography . . . . .	43		
Government and Politics . . . . .	51		
Faculty . . . . .			70

# University Calendar, 1965-66

(TENTATIVE)

## *FALL SEMESTER, 1965*

### SEPTEMBER

- 13-17 Monday through Friday—Fall Semester Registration
- 20 Monday—Instruction begins

### NOVEMBER

- 24 Wednesday, after last class—Thanksgiving recess begins
- 29 Monday, 8:00 A.M.—Thanksgiving recess ends

### DECEMBER

- 22 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Monday, 8:00 A.M.—Christmas recess ends
- 17 Monday—Pre-exam Study Day
- 18-24 Tuesday-Monday—Fall Semester Examinations

## *SPRING SEMESTER, 1966*

### JANUARY-FEBRUARY

- 31-4 Monday through Friday—Spring Semester Registration
- 7 Monday—Instruction begins
- 22 Tuesday—Washington's Birthday, holiday

### MARCH

- 25 Friday—Maryland Day, not a holiday

### APRIL

- 7 Thursday, after last class—Easter recess begins
- 12 Tuesday, 8:00 A.M.—Easter recess ends

### MAY

- 11 Wednesday—AFROTC Day
- 25 Wednesday—Pre-exam Study Day
- 26-June 3 Thursday through Friday—Spring Semester Examinations
- 29 Sunday—Baccalaureate Exercises
- 30 Monday—Memorial Day, holiday

### JUNE

- 4 Saturday—Commencement Exercises

## *SUMMER SESSION, 1966*

### JUNE

- 20-21 Monday, Tuesday—Registration, Summer Session
- 22 Wednesday—Instruction begins
- 25 Saturday—Classes (Monday schedule)

### JULY

- 4 Monday—Independence Day, holiday
- 9 Saturday—Classes (Tuesday schedule)

### AUGUST

- 12 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1966*

### JUNE

- 13-17 Monday through Friday—Rural Women's Short Course

### AUGUST

- 1-5 Monday through Friday—4-H Club Week

### SEPTEMBER

- 6-9 Tuesday through Friday—Fireman's Short Course

# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

12-16 Monday-Friday—Fall Semester Registration

19 Monday—Instruction begins

### NOVEMBER

23 Wednesday, after last class—Thanksgiving recess begins

28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

21 Wednesday, after last class—Christmas recess begins

### JANUARY

3 Tuesday, 8:00 A. M.—Christmas recess ends

18 Wednesday—Pre-exam Study Day

19-25 Thursday-Wednesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

31-Feb. 3 Tuesday-Friday—Spring Semester Registration

### FEBRUARY

6 Monday—Instruction begins

22 Wednesday—Washington's Birthday, holiday

### MARCH

23 Thursday, after last class—Easter recess begins

28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

10 Wednesday—AFROTC Day

24 Wednesday—Pre-exam Study Day

25-June 2 Thursday-Friday—Spring Semester Examinations

28 Sunday—Baccalaureate Exercises

30 Tuesday—Memorial Day, holiday

### JUNE

3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

19-20 Monday-Tuesday—Registration. Summer Session

21 Wednesday—Instruction begins

24 Saturday—Classes (Monday schedule)

### JULY

4 Tuesday—Independence Day, holiday

8 Saturday—Classes (Tuesday schedule)

### AUGUST

11 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

MRS. JOHN L. WHITEHURST

*4101 Greenway, Baltimore, 21218*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT. BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### ASSISTANT TO THE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schutz—*B.S., University of Maryland, 1938; M.S., 1940.*

#### DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

#### DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

#### ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

#### DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

#### ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

### *Emeriti*

#### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

#### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

#### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

### *Deans of the Schools and Colleges*

#### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D., 1940.*

#### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

#### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

#### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

#### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

#### ACTING DEAN OF THE COLLEGE OF ENGINEERING

Russell B. Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

#### DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY

Homer W. Schamp—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

#### DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1925; *Ph.D.*, *Columbia University*, 1931.

#### ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna R. Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, 1936.

#### DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

#### DEAN OF THE SCHOOL OF LIBRARY AND INFORMATION SERVICES

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

#### DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

#### DEAN OF THE SCHOOL OF NURSING

Florence M. Gipe—*B.S.*, *Catholic University of America*, 1937; *M.S.*, *University of Pennsylvania*, 1940; *Ed.D.*, *University of Maryland*, 1952.

#### DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

#### DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

#### DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

#### DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

### *Directors of Educational Services and Programs*

#### EXECUTIVE DEAN FOR STUDENT LIFE

Leslie R. Bundgaard—*B.S.*, *University of Wisconsin*, 1948; *M.S.*, 1949; *Ph.D.*, *Georgetown University*, 1954.

#### DEAN OF WOMEN

Helen E. Clarke—*B.S.*, *University of Michigan*, 1943; *M.A.*, *University of Illinois*, 1951; *Ed.D.*, *Teachers College, Columbia University*, 1960.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### ACTING DIRECTOR, COMPUTER SCIENCE CENTER

John P. Menard—*B.A., St. Michael's College, Vt., 1954.*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

THE UNIVERSITY OF MARYLAND IS FAVORABLY LOCATED FOR THE ACCOMMODATION of students interested in business and public administration. Students interested in economics, political science, journalism and geography, other disciplines taught within the College, find a similarly distinct advantage in being at College Park. Downtown Washington is only 25 minutes away in one direction, while the Baltimore business district is less than an hour in the other. There is frequent transportation service from College Park to each city. Qualified students may obtain a firsthand view of the far-flung economic and political activities of the national government, and may utilize the libraries and other facilities available in Washington.

The College's six instructional departments offer a broad range of curricula in professional fields and in social science disciplines. The separate programs of study frequently draw upon courses in complementary fields within the College. The six departments and the major departmental offerings are:

## I. Department of Business Administration

1. The General Curriculum in Business Administration
2. Accounting
3. Finance
4. Insurance and Real Estate
5. Marketing
6. Personnel and Industrial Relations
7. Production Management
8. Statistics
9. Transportation
10. Combined Business Administration and Law

## II. Department of Economics

## III. Department of Geography

1. General Curriculum in Geography
2. Urban Geography
3. Cartography

## IV. Department of Government and Politics

1. General Curriculum in Government and Politics
2. International Affairs
3. Public Administration

## V. Department of Journalism

## VI. Department of Information Systems Management

## VII. Bureau of Business and Economic Research

## VIII. Bureau of Governmental Research

## IX. Affiliated Governmental Organizations

1. Maryland Municipal League
2. State Association of County Commissioners of Maryland

## GENERAL INFORMATION

### GENERAL INFORMATION

Detailed information concerning the General Education Program, fees and expenses, scholarships and awards, student life, and other material of a general nature, may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park 20740. A detailed explanation of the regulations of student and academic life may be found in the University publication titled, *University General and Academic Regulations*. This is mailed in September and February of each year to all new undergraduate students.

Requests for course catalogs for the individual schools and colleges should be directed to the deans of these respective units, addressed to:

#### COLLEGE LOCATED AT COLLEGE PARK:

Dean  
(College in which you are interested)  
The University of Maryland  
College Park, Maryland 20740

#### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean  
(School in which you are interested)  
The University of Maryland  
Lombard and Greene Streets  
Baltimore, Maryland 21201

#### GENERAL EDUCATIONAL PROGRAM:

A college education implies something more than an adequate technical training in the student's field of specialization. In order that each graduate with a Bachelor's degree may gain a liberal education as well as a specialized one, the University has established a General Education Requirement. This requirement consists of 34 semester hours of credit in six general fields. There is a wide choice in specific courses which may be used to satisfy requirements in all of the six fields except English. Physical Education and Health requirements for all students are taken in addition to this 34-hour group of courses. Although the courses in the General Education Program are prescribed generally, some choice is permitted, especially for students who demonstrate in classification tests good previous preparation in one or more of the required subjects. For a more complete description of the program refer to *General and Academic Regulations*, pages 27-30.

## ACADEMIC INFORMATION

*Degrees*

The University confers the following degrees on students completing programs of study in departments of the College: Bachelor of Science, Master of Business Administration, Master of Arts, and Doctor of Philosophy. Each candidate for a degree must file in the Office of the Registrar on a date announced for each semester a formal application for a degree. Candidates for degrees must attend a convocation at which degrees are conferred and diplomas are awarded. Degrees are confirmed *in absentia* only in exceptional cases.

*Graduation Requirements*

A minimum of 120 semester hours of credit with an average of "C" in courses suggested by the College in addition to the specified courses in physical activities and health are required for graduation. A minimum of 57 hours of the required 120 hours must be in upper division courses, with the exception that the student may, with the consent of the Dean, offer certain lower division courses in mathematics, natural science, and foreign language in partial fulfillment of the requirement. Usually the departments within the College will require that the student have, in addition to an overall "C" average, an average of "C" or better in those courses comprising the student's major area of study. The time normally required to complete the requirements for the bachelor's degree is eight semesters.

*Junior Standing*

To earn junior standing a student enrolled prior to June, 1965, must complete 56 semester hours of academic credit with an average grade of "C" (2.0) or better. In computing this average, the following provisions apply: all academic courses carrying one or more credits which have been taken up to the time of computation shall be included; courses carrying "O" credit shall not be included; courses with grade "F" shall be included; courses in physical education required of all University students, and the health course required of all students shall not be included.

Students enrolled during or after the summer session of academic year 1965-1966: Students in this category must achieve the minimum requirements for retention and graduation set forth in the *General and Academic Regulations*, 1965-67, pages 45, 49. Copies of this publication are available from the Director of Admissions and Registrations, North Administration building.

Detailed regulations pertaining to junior standing are presented in full in the publication, *General and Academic Regulations*.

### *Senior Residence Requirement*

After a student has earned acceptable credit to the extent of 90 semester hours exclusive of the required work in physical activities, and hygiene, either at the University of Maryland or elsewhere, he must earn a subsequent total of at least 30 semester hours with an average grade of "C" or better at the University of Maryland. No part of these credits may be transferred from another institution. Specific requirements for graduation in the selected curriculum must be met.

### *Air Science Instruction*

Air Science is offered at the University of Maryland on a completely elective basis. The Department of Air Science offers a 2-year and a 4-year program, either of which qualifies a student for a commission in the United States Air Force on graduation. Financial assistance is provided for students in the Advanced program.

Selected students who wish to do so may, with proper approval, carry as electives during their junior and senior years Advanced Air Science courses which lead to a commission in the United States Air Force. For further details concerning Air Science, refer to *General and Academic Regulations*, a publication available to all entering undergraduate students.

### *Costs*

Actual annual costs of attending the University include \$250.00 fixed charges; \$96.00 special fees; \$420.00 board; \$320.00 lodging for Maryland residents, or \$420.00 for residents of other states and countries. A matriculation fee of \$10.00 is charged all new students. A charge of \$400.00 is assessed to all students who are non-residents of the State of Maryland.

A fee of \$10.00 must accompany a prospective student's application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee.

*An Adventure in Learning*, the undergraduate bulletin of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park 20740.

## ADMISSION

### FALL SEMESTER

All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before June 1. Any student registering for nine or more semester hours of work is considered a full-time student.

Under unusual circumstances, application will be accepted between June 1 and September 1. Applicants for full-time attendance filing after June 1 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by July 15. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by August 1.

### SPRING SEMESTER

The deadline for the receipt of applications for the Spring Semester is January 1.

### UNIVERSITY COLLEGE

The application deadlines and fees *do not* apply to students registering in the evening classes offered by the University College.

### GRADUATE SCHOOL

Application for admission to the Graduate School must be made by September 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline date is generally June 1.

## *Entrance Requirements*

Requirements for admission to the College are those of the University.

To assure a likelihood of success in the College, it is recommended that the student have four units of English, three or more units of College Preparatory Mathematics—including a *minimum* of two units of Algebra and one unit of Geometry, one or more units of History and Social Science, two or more units of Natural Science, and two or more units of Foreign Language. Students expecting to enroll in the College of Business and Public Administration should pursue the pre-college program in high school.

## HONORS, AWARDS, AND SCHOLARSHIPS

### FINANCIAL AID AND ASSISTANCE

The College has a number of graduate assistantships in the Departments of Business Administration, Economics, Geography, Journalism, and Government and Politics, and in the Bureau of Business and Economic Research and the Bureau of Governmental Research. Applications for assistantships should be made directly to the Dean of the College of Business and Public Administration. (See the *Graduate School Catalog* for rules and regulations).

## HONORS, AWARDS AND SCHOLARSHIPS

### *The Dean's List of Distinguished Students*

Any student who has passed at least 12 hours of academic work in the preceding semester, without failure of any course, and with an average grade on all courses of at least 3.5 will be placed on the Dean's List of Distinguished Students.

### *Beta Gamma Sigma*

The Alpha of Maryland Chapter of Beta Gamma Sigma was chartered in 1940. The purpose of this honorary society is to encourage and reward scholarship and accomplishment among students of commerce and business administration; to promote the advancement of education in the art and science of business; and to foster integrity in the conduct of business operations. Chapters of Beta Gamma Sigma are chartered only in schools holding membership in the American Association of Collegiate Schools of Business. Third and fourth year students in business administration are eligible; if in his third year, a student must rank in the highest four percent of his class, and if in his fourth year, he must rank in the highest ten percent in order to be considered for selection.

### *The Delta Sigma Pi Scholarship Key*

This is awarded annually to the student who has maintained the highest scholastic standing during the entire course of study in business administration or economics. Delta Sigma Pi was founded at New York University on November 7, 1907. The Gamma Sigma of Maryland chapter was chartered at the University of Maryland in 1950. Delta Sigma Pi is a professional fraternity organized to foster the study of business in universities; to encourage scholarship, social activity, and the association of students for their mutual advancement by research and practice; to promote closer affiliation between the commercial world and students of commerce; and to further a high standard of commercial ethics and culture, as well as the civic and commercial welfare of the community. Members are selected from the College of Business and Public Administration on the basis of leadership, scholastic standing and promise of future business success.

### *Kappa Tau Alpha*

The Maryland chapter of Kappa Tau Alpha was chartered in 1961. Founded in 1910, this national honorary society has 39 chapters at universities offering graduate or undergraduate preparation for careers in professional journalism. It is dedicated to recognition and promotion of scholarship in journalism. Among its activities is an annual award for an outstanding piece of published research in journalism and mass communications.

### *Maryland-Delaware Press Association Annual Citation*

This award is presented to the outstanding senior in journalism.

### *Phi Chi Theta Key*

The Phi Chi Theta Key is awarded to the outstanding graduating senior woman in Business Administration or Business Education Administration on the basis of scholarship, activities, and leadership.

### *Public Relations Society of America Annual Citation*

The Baltimore Chapter of the Public Relations Society of America awards an annual citation to the top graduating senior in Journalism who has an interest in public relations.

### *The Wall Street Journal Student Achievement Award*

This is awarded annually to the graduating senior who has maintained the highest scholastic achievement in the field of financial administration. The award consists of a silver medal and one year's subscription to *The Wall Street Journal*.

## SCHOLARSHIPS

The Alcoa Foundation Scholarship in the amount of \$500 is awarded to a junior majoring in Transportation with a special interest in industrial traffic management.

The Alumni Association of the University provides a scholarship of \$250.

The Baltimore Sunpapers Scholarships in Journalism are awarded to two deserving students. The scholarships, in the amount of \$500 each, are contributed by the Board of Trustees of the A. S. Abell Foundation, Inc., and are awarded to seniors majoring in editorial journalism.

The Baltimore News-American provides two \$500 journalism scholarships. The Delmarva Traffic Club makes available a scholarship of \$250 for an outstanding transportation student in the junior class making his home on the Delmarva peninsula.

## HONORS, AWARDS, AND SCHOLARSHIPS

Federal Government Accountants Association of Washington awards a scholarship in the amount of \$300 to a full-time undergraduate majoring in accounting.

The Haskins & Sells Foundation, Inc., makes available a scholarship of \$500 for an exceptional senior student concentrating in accounting who is registered in the College of Business and Public Administration. In addition to the cash award, a token award in the form of an inscribed silver medallion will be given to each award winner.

The Maryland Association of Certified Public Accountants, Inc., awards a scholarship in the amount of \$200 to a Maryland resident majoring in accounting.

Motor Fleet Supervisors Institute—A \$250 award is made to a member of the junior class majoring in Transportation with an interest in motor transportation who has shown in three years of training an apparent ability to succeed. This award is made through the College of Business and Public Administration.

The Montgomery County Press Association's \$200 journalism scholarship is awarded to a student of that county.

Pilot Freight Carriers, Inc., Winston-Salem, North Carolina, provides a \$500 award to a senior in the College who is concentrating in Transportation with a major interest in motor transportation.

The Arthur Young and Co. Foundation, Inc., makes available certain funds for awards for superior senior students concentrating in accounting who are registered in the College.

# Required Courses

## I. BUSINESS ADMINISTRATION

Business organizations are set up primarily for the purpose of producing and distributing goods and services. Modern business administration requires a knowledge and understanding of organizational structures, operations and environments. The curricula of the Department of Business Administration emphasize the principles and problems involved in the development of organizations and in the formulation and implementation of their policies.

### STUDY PROGRAMS IN THE DEPARTMENT

The programs of study in the Department of Business Administration are so arranged as to facilitate concentrations according to the major functions of business management. This plan is not, however, based on the view that these major divisions are independent units, but rather that each is closely related to and dependent on the others. Every student in Business Administration is required to complete satisfactorily a minimum number of required basic subjects in the arts, sciences, and humanities as prerequisites to work in the major management fields.

### FRESHMAN AND SOPHOMORE REQUIREMENTS

English 1, 3, and 4 (or 21, 3 and 4) .....	9 hours
Math 10 and 11 (or 19 and 20) .....	6(8)
Speech 1 .....	3
History (Unless exempt student must take at least 3 hours of American History) .....	6
B. A. 10 .....	3
Economics 4 (students electing to take a foreign language may exempt this course) .....	3
B. A. 20 and 21 .....	6
Economics 31 and 32 .....	6

Two science courses (one biological and one physical, and at least one of which must be a lab science) selected from the following:

Physical	Astronomy .....	3	
	Geology .....	3	
	Physics .....	3	
	Chemistry .....	4	
Biological	Botany .....	4	
	Zoology .....	4	
	Microbiology .....	4	7-8

A social science course (Econ. 31 may be used for 3 hours of the 6 hour social science requirement) selected from the following:

G. and P. 1 .....	3	
Psychology 1 .....	3	
Sociology 1 .....	3	
Anthropology 1 .....	3	3

## BUSINESS ADMINISTRATION

A. fine arts requirement of 3 hours of which the following are representative:

Philosophy 1, 41, 45, 53	3	
Art 10, 60, 61, 80	3	
Music 20	3	
Speech 16	3	3
Electives (chosen with approval of adviser)		6- 9 <sup>1</sup>
Health 5 (men and women)		1 sem. (2 cr.)
P. E. (men and women)		2 semesters

---

\*Students who wish to elect a foreign language must take nine semester hours of the language in order to obtain credit. Such students may substitute the first semester of foreign language for the Econ. 4 requirement, and the other semesters for two free electives. Students planning to major in Statistics should take Math. 14 and 15.

### A TYPICAL PROGRAM FOR FIRST TWO YEARS FOR THOSE STUDENTS IN THE DEPARTMENT OF BUSINESS ADMINISTRATION:

#### *Freshman Year*

English 1 (or 21)	3	English 3	3
B.A. 10 or Sp. 1	3	Sp. 1 or B.A. 10	3
Math. 10 (or 19)	3	Math. 11 (or 20)	3
Econ. 4	3	Health 5	2
Fine Arts, Social Science, or Natural Science <sup>1</sup>	3-4	Fine Arts, Social Science, or Natural Science <sup>1</sup>	3-4
P.E.	1	P.E.	1
	<hr/>		<hr/>
	16-17		15-16

#### *Sophomore Year*

English 4	3	Elective	3
B.A. 20	3	B.A. 21	3
Econ. 31	3	Econ. 32	3
History (American)	3	History (other than American History)	3
Fine Arts, Social Science, or Natural Science <sup>1</sup>	3-4	Fine Arts, Social Science, or Natural Science <sup>1</sup>	3-4
	<hr/>		<hr/>
	15-16		15-16

<sup>1</sup> Requirement is 3 hours of Fine Arts. 3 hours of Social Science, and 7 or 8 hours of Natural Science.

## JUNIOR AND SENIOR REQUIREMENTS

During the junior and senior years each student is required to complete the following specified courses:

B.A. 130—Business Statistics I	3
B.A. 140—Business Finance	3
B.A. 149—Marketing Principles and Organization	3
B.A. 168—Management and Organization Theory	3
B.A. 180—Business Law	3
B.A. 199—Business Policies	3
	<hr/>
Total	18

In addition to the above, two 100 level courses must be taken in Economics, at least one of which must be: Econ. 102, National Income Analysis; Econ. 132, Advanced Economic Principles; Econ. 140, Money and Banking; or Econ. 148, International Economics.

At least 48 hours of the 120 semester hours of academic work required for graduation must be in the Business Administration subjects. In addition to the requirement of an overall average of "C" in academic subjects, an average of "C" in Business Administration subjects is required for graduation. Electives in the curricula of the Department may, with the consent of the advisor, be taken in any department of the university if the student has the necessary prerequisites.

THE GENERAL CURRICULUM IN  
BUSINESS ADMINISTRATION

The General Curriculum in Business Administration is designed for those who desire a broad program in management. The curriculum contains a relatively large number of elective courses. Selection is subject to approval by an advisor and must contribute to a program of courses closely balanced between (1) a functional field, (2) the various basic areas of management and (3) non-business fields.

Students selecting this curriculum will take the basic courses required for all students in the Department of Business Administration. In addition, students will take:

(1) The following required courses:

B.A. 150—Marketing Management	3 s.h.
B.A. 160—Personnel Management I or B.A. 163 Labor Relations	3 s.h.
B.A. 170—Principles of Transportation	3 s.h.
B.A. 189—Business and Government	3 s.h.
B.A. 198—Structure and Operations of Industries	3 s.h.
	<hr/>
	15 s.h.

## BUSINESS ADMINISTRATION

(2) three semester hours from the following:

B.A. 110—Intermediate Accounting (3)	
B.A. 148—Advanced Financial Management (3)	
	3 s.h.
B.A. 167—Operations Research I (3)	
B.A. 184—Public Utilities (3)	
Total	18 s.h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	18 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 s.h. required for graduation	18 s.h.
Total junior-senior year requirements	60 s.h.

## ACCOUNTING

Accounting, in a limited sense, is the analysis, classification, and recording of financial events and the reporting of the results of such events for an organization. In a broader sense, accounting consists of all financial devices for planning, controlling and appraising performance of an organization. In this broader sense, accounting includes among its many facets financial planning, budgeting, accounting systems, financial management controls, financial analysis of performance, financial reporting, internal and external auditing and taxation of business.

The accounting curriculum provides an educational foundation for careers in accounting, and a foundation for future advancement in other management areas whether in private business organizations, government agencies, or public accounting firms. Students who select this curriculum will complete the freshman and sophomore requirements for all students in the Department of Business Administration.

Course requirements for the junior and senior years are:

(1) the junior-senior requirements for all students in the Department of Business Administration,

(2) the following accounting courses:

B.A. 110, 111—Intermediate Accounting	6
B.A. 121—Cost Accounting	4
B.A. 123—Income Tax Accounting	4

and 9 semester hours from the following:

B.A. 118—Governmental Accounting	3
B.A. 119—Budgeting and Control	3

B.A. 120—Accounting Systems	3
B.A. 122—Auditing Theory and Practice	3
B.A. 124, 126—Advanced Accounting	3, 3
B.A. 125—C.P.A. Problems	3
B.A. 127—Advanced Auditing Theory and Practice	3
B.A. 128—Advanced Cost Accounting	2

Note: B.A. 120 and 124 are offered only in the summer session.

Thus, the upper division requirements for accounting majors are:

Junior-senior requirements of all departmental students.	18 s. h.
Junior-senior accounting requirements (minimum)	23 s. h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s. h.
Electives (to complete 120 semester hours required for graduation)	13 s. h.
Total Junior-senior year requirements	60 s. h.

The maximum number of semester hours of credit for accounting courses that may be counted toward the graduation requirement is thirty-five. If thirty-five semester hours are taken toward graduation, either B.A. 118 or 119 must be included.

For graduates of the University of Maryland, the educational requirement of the Maryland State Board of Public Accountancy for taking the C.P.A. examination *without practical experience* total thirty-eight semester hours of accounting courses plus eight semester hours of business law. Students wishing to satisfy the Board's requirements must successfully complete all accounting courses except B.A. 118, 119, and 128. Also they must successfully complete B.A. 181 and 182, as well as the required B.A. 180, to satisfy the Board's business law requirements. *Only thirty-two semester hours of the Board's accounting requirements may be credited toward graduation requirements.* Thus, a student wishing to satisfy both the graduation requirements and the requirements of the Board to sit for the C.P.A. examination *without experience* must take six semester hours of accounting courses beyond the maximum that may be credited for graduation. This can be done only by attending one summer session, for B.A. 120, 124, and 182 are offered only during the summer. Students not wishing to satisfy the Board's requirements to sit for the C.P.A. examination without experience are eligible to take the examination after obtaining two years of practical experience satisfactory to the Board.

A student planning to take the C.P.A. examination in a State other than Maryland should determine the course requirements, if any, for such State, and arrange his program accordingly.

## FINANCE

The curriculum in finance is designed to acquaint the student with financing methods and institutions and to familiarize him with the basic

## BUSINESS ADMINISTRATION

principles of financial analysis as used in managerial decision-making. Career destinations in the general area of finance include those in corporate financial management; investment management; the banking fields and insurance. Careers are also open in government service, for example, in regulatory agencies and international finance.

Students selecting this curriculum will take, in addition to the courses required for all students in the Department of Business Administration:

(1) The following required courses

B.A. 110, 111—Intermediate Accounting	6 s. h.
B.A. 141—Security Analysis	3 s. h.
B.A. 143—Credit Management	3 s. h.
B.A. 148—Advanced Financial Management	3 s. h.
Total	<hr/> 15 s. h.

and

(2) three semester hours from the following:

Econ. 142—Public Finance (3)	}	3 s. h.
Econ. 147—Business Cycles (3)		
B.A. 167—Operations Research I (3)		
B.A. 184—Public Utilities (3)		
B.A. 196—Urban Land Management (3)		
Total		<hr/> 18 s. h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s. h.
Junior-senior curriculum concentration	18 s. h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s. h.
Electives to complete 120 semester hours required for graduation	18 s. h.
Total Junior-senior year requirements	<hr/> 60 s. h.

## INSURANCE AND REAL ESTATE

Students interested in insurance or real estate may concentrate either in General Business or Finance and plan with their advisers a group of electives to meet their specialized needs. Courses offered in insurance and real estate include risk management, principles of risk and insurance, real estate principles, and urban land management.

## MARKETING

Marketing involves the functions performed in getting goods and services from producers to users. Career opportunities exist in manufacturing,

## BUSINESS ADMINISTRATION

wholesaling and retailing and include sales administration, marketing research, advertising and merchandising.

Students preparing for work in marketing research are advised to elect additional courses in Statistics.

In addition to the courses taken by all students in the Department of Business Administration, the marketing program consists of:

(1) the following required courses:

B.A. 150—Marketing Management	3 s.h.
B.A. 151—Advertising	3 s.h.
B.A. 154—Retail Management	3 s.h.
B.A. 156—Marketing Research	3 s.h.
Total required	12 s.h.

and

(2) six semester hours from the following:

B.A. 143—Credit Management (3)	}	6 s.h.
B.A. 132—Sample Surveys in Business and Economics (3)		
B.A. 153—Purchasing Management (3)		
B.A. 157—International Marketing (3)		
B.A. 158—Advertising Management (3)		
B.A. 171—Traffic and Physical Distribution Management (3)		
B.A. 167—Operations Research I (3)	}	
B.A. 101—Electronic Data Processing (3)		
Journ. 152—Advertising Copy and Layout (3)		
Total		18 s.h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	18 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 semester hours required for graduation	18 s.h.
Total, Junior-senior year requirements	60 s.h.

## PERSONNEL AND LABOR RELATIONS

Personnel administration has to do with the direction of human effort. It is concerned with securing, maintaining, and utilizing an effective working force. People professionally trained in personnel administration

## BUSINESS ADMINISTRATION CURRICULUM

find career opportunities in business, in government, in education institutions, and in charitable and other organizations.

(1) The required courses are:

B.A. 160—Personnel Management I	3 s.h.
B.A. 161—Personnel Management II	3 s.h.
B.A. 163—Labor Relations	3 s.h.
B.A. 164—Labor Legislation	3 s.h.

Total required	12 s.h.
----------------	---------

and

(2) six hours from the following:

B.A. 131—Business Statistics II (3)	}	6 s.h.
B.A. 132—Sample Surveys in Business and Economics (3)		
B.A. 167—Operations Research I (3)		
B.A. 169—Production Management (3)		
B.A. 189—Business and Government (3)		

Total	18 s.h.
-------	---------

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	18 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 semester hours required for graduation	18 s.h.

Total, Junior-senior year requirements	60 s.h.
--	---------

## PRODUCTION MANAGEMENT

This curriculum is designed to acquaint the student with the problems of organization and control in the field of production management. Theory and practice with reference to organization, policies, methods, processes and techniques are surveyed, analyzed, and evaluated.

The courses in addition to those required of all students in the Department of Business Administration are:

(1) The following required courses:

B.A. 121—Cost Accounting	4 s.h.
B.A. 160—Personnel Management I	3 s.h.
B.A. 169—Production Management	3 s.h.
B.A. 165—Advanced Production Management	3 s.h.

Total required	13 s.h.
----------------	---------

and

## BUSINESS ADMINISTRATION CURRICULUM

(2) six hours from the following:

B.A. 134—Statistical Quality Control (3)	}	6 s.h.
B.A. 153—Purchasing Management (3)		
B.A. 163—Labor Relations (3)		
B.A. 167—Operations Research I (3)		
B.A. 171—Traffic and Physical Distribution Management (3)		
Total		19 s.h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	19 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 semester hours required for graduation	17 s.h.
Total Junior-senior year requirements	60 s.h.

## STATISTICS

Statistics consists of a body of methods for utilizing probability theory in decision-making processes. Important statistical activities ancillary to the decision-making process are the systematization of quantitative data and the measurement of variability. Some specialized areas within the field of statistics are: sample surveys, forecasting quality control, design of experiments, Bayesian decision processes, actuarial statistics, and data processing. Statistical methods—for example, sample survey techniques—are widely used in accounting, marketing, industrial management and government applications.

An aptitude for applied mathematics and a desire to understand and apply scientific methods to significant problems are important prerequisites for the would-be statistician.

Students planning to major in statistics should take Math. 14 and 15.

Students selecting this curriculum will take, in addition to the courses required for all students in the Department of Business Administration:

(1) the following required courses:

B.A. 131—Business Statistics II	3 s.h.
B.A. 132—Sample Surveys in Business and Economics	3 s.h.
B.A. 134—Statistical Quality Control	3 s.h.
B.A. 101—Electronic Data Processing	3 s.h.
	12 s.h.

## BUSINESS ADMINISTRATION CURRICULUM

and

(2) six semester hours from the following:

B.A. 102—Electronic Data Processing Applications (3)	}	6 s.h.
B.A. 135—Statistical Analysis and Forecasting (3)		
B.A. 167—Operations Research I (3)		
Math. 133—Applied Probability and Statistics I (3)		
Total		18 s.h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	18 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 s.h. required for graduation	18 s.h.
Total junior-senior requirement	60 s.h.

## TRANSPORTATION

Transportation involves the movement of persons and goods in the satisfaction of human needs. The curriculum in transportation includes an analysis of the services and management problems, such as pricing, financing, and organization, of the five modes of transport—air, motor, pipelines, railroads, and water—and covers the scope and regulation of transportation in our economy. The effective management of transportation involves a study of the components of physical distribution and the interaction of procurement, the level and control of inventories, warehousing, material handling, transportation, and data processing.

The curriculum in transportation is designed to prepare students to assume responsible positions with carriers, governmental agencies, and traffic and physical distribution management in industry.

Course requirements are, in addition to the junior-senior requirements for all students in the Department of Business Administration:

(1) the required following courses:

B.A. 170—Principles of Transportation	3 s.h.
B.A. 171—Traffic and Physical Distribution Management	3 s.h.
B.A. 172—Motor Transportation	3 s.h.
B.A. 174—Commercial Air Transportation	3 s.h.
B.A. 175—Advanced Transportation Problems	3 s.h.
Total	15 s.h.

and

(2) three semester hours to be selected from the following:

B.A. 173—Water Transportation	}	3 s.n.
B.A. 176—Urban Transport and Urban Development (3)		
B.A. 157—International Marketing (3)		
B.A. 184—Public Utilities (3)		
Total required		18 s.h.

Thus, the upper division requirements are:

Junior-senior requirements of all departmental students	18 s.h.
Junior-senior curriculum concentration	18 s.h.
Electives in 100 level economics courses at least one of which must be Econ. 102, 132, 140, or 148	6 s.h.
Electives to complete 120 s.h. required for graduation	18 s.h.
Total junior-senior year requirements	60 s.h.

## COMBINED BUSINESS ADMINISTRATION AND LAW PROGRAM

The Department of Business Administration offers a combined Business Administration-Law Curriculum in which the student completes three years in the General Curriculum in Business Administration in the department and a fourth year of work in the Law School of the University of Maryland. Admission to the Law School is contingent upon meeting the applicable standards of that school. Individual students are responsible to secure from the Law School its current admission requirements. The student must complete all the courses required of students in the Department plus the courses normally required for the General Curriculum in Business Administration through the junior year, plus enough electives to equal a minimum of 90 semester hours; an average grade of "C" or better must be earned. No business law course can be included in the 90 hours. The last year of college work before entering the Law School must be completed in residence at College Park. At least 30 hours of work must be in courses numbered 100 or above.

The Bachelor of Science degree from the College of Business and Public Administration is conferred upon students who complete the first year in the Law School with an average grade of "C" or better.

## MASTER OF BUSINESS ADMINISTRATION

Candidates for the degree of Master of Business Administration are accepted in accordance with the procedures and requirements for the Graduate School. (See the Graduate School Announcements, Section II.)

## BUSINESS ADMINISTRATION

## BUSINESS ADMINISTRATION

*Professors:* TAFF, CLEMENS, COOK, FISHER, GENTRY, NELSON, AND WRIGHT.

*Associate Professors:* ANDERSON, ASHMAN, DAWSON, AND SPIVEY.

*Assistant Professors:* BAKER, BARTLETT, BRUNNER, CARROLL, CLICKNER, CULBERTSON, DAIKER, EDELSON, HERMANSON, HILLE, HIMES, NASH, OLSON, PAINE, RYANS, SCHELLENBERGER, SMERK, SPYCHALSKI, SUELFLOW, TOSI.

*Instructors:* DONNELLY, FREY, HISE, IVANCEVICH, McCAUL, MARTHINUSS, NEFFINGER, PISANI, ROSEN, SHERMAN, STRAWSER, WEBB.

### B.A. 10. BUSINESS ENTERPRISE. (3)

A survey course covering the internal and functional organization of a business enterprise, its organization and control.

### B.A. 20, 21. PRINCIPLES OF ACCOUNTING. (3, 3)

Prerequisite, sophomore standing. The principles of accounting for business enterprise and the use of accounting data in making business decisions.

### *For Graduates and Advanced Undergraduates*

### B.A. 100. OFFICE OPERATIONS AND MANAGEMENT. (3)

Prerequisite, junior standing. Deals with the principles of scientific management as they apply to the examination, improvement, installation, and operation of the most effective paperwork methods and systems that a given organization can use to achieve its objectives. Procedure flow analysis and form design for control of paperwork; process, work distribution, and layout charts, distribution of authority and responsibility for office activities are among the areas considered.

### B.A. 101. ELECTRONIC DATA PROCESSING. (3)

Prerequisite, junior standing, Math. 11 or the equivalent. Laboratory fee, \$10.00. The electronic digital computer and its use as a tool in processing data. The course includes the following areas: (1) organization of data processing systems, (2) environmental aspects of computer systems, (3) fundamentals of programming using a common problem-oriented language, and (4) management control problems and potentials inherent in mechanized data processing systems.

### B.A. 102. ELECTRONIC DATA PROCESSING APPLICATIONS. (3)

Prerequisite, B.A. 101. Laboratory fee, \$10.00. Intensive study of computer applications using a problem-oriented language. Introduction of computer methods for the solution of business problems. Laboratory exercises in programming and development of computer techniques.

### B.A. 103. INTRODUCTION TO SYSTEMS ANALYSIS. (3)

Prerequisite, B.A. 102. Math. 15 or the equivalent. Laboratory fee, \$10.00. The use of the computer in management and the operation of business. The course includes the following areas: (1) the principles of systems analysis, (2) recent applications and innovations of the systems concept, (3) design and im-

plementation of computer systems, including such techniques as mathematical programming, simulation, business games, and network analysis, (4) laboratory use of a digital computer in the application of these techniques.

**B.A. 110, 111. INTERMEDIATE ACCOUNTING. (3, 3)**

Prerequisite, B.A. 21. A comprehensive study of the theory and problems of valuation of assets, application of funds, corporation accounts and statements, and the interpretation of accounting statements.

**B.A. 112. RECORDS MANAGEMENT. (2)**

First and second semesters. Prerequisite, junior standing. Laboratory fee, \$7.50. Specific management methods and techniques that have proved valuable in the creation, use, maintenance, protection and disposition of records are studied.

**B.A. 118. GOVERNMENTAL ACCOUNTING. (3)**

Prerequisite, B.A. 21. The content of this course covers the scope and functions of governmental accounting. It considers the principles generally applicable to all forms and types of governmental bodies and a basic procedure adaptable to all governments.

**B.A. 119. BUDGETING AND CONTROL. (3)**

Prerequisite, B.A. 21. The use of financial data in controlling an enterprise. Budgetary formulation, execution and appraisal. The use of accounting in managerial decision making.

**B.A. 120. ACCOUNTING SYSTEMS. (3)**

Prerequisite, B.A. 20. A study of the factors involved in the design and installation of accounting systems: the organization, volume and types of transactions, charts of accounts, accounting manuals, the reporting system. Offered only in Summer School.

**B.A. 121. COST ACCOUNTING. (4)**

Prerequisite, B.A. 21. A study of the fundamental procedures of cost accounting, including those for job order, process and standard cost accounting systems.

**B.A. 122. AUDITING THEORY AND PRACTICE. (3)**

Prerequisite, B.A. 111. A study of the principles and problems of auditing and application of accounting principles to the preparation of audit working papers and reports.

**B.A. 123. INCOME TAX ACCOUNTING. (4)**

Prerequisite, B.A. 21. A study of the important provisions of the Federal Tax Laws, using illustrative examples, selected questions and problems, and the preparation of returns.

**B.A. 124. ADVANCED ACCOUNTING. (3)**

Prerequisite, B.A. 111. Advanced Accounting theory applied to specialized problems in partnerships, ventures, consignments, installment sales, insurance, statement of affairs, receiver's accounts, realization and liquidation reports, and application of mathematics to accounting problems. Offered only in Summer School.

**B.A. 125. C.P.A. PROBLEMS. (3)**

Prerequisite, B.A. 111, or consent of instructor. A study of the nature, form and content of C.P.A. examinations by means of the preparation of solutions

## BUSINESS ADMINISTRATION

to, and an analysis of, a large sample of C.P.A. problems covering the various accounting fields.

### B.A. 126. ADVANCED ACCOUNTING. (3)

Prerequisite, B.A. 111. Home office and branch accounting, parent and subsidiary accounting, and foreign exchange.

### B.A. 127. ADVANCED AUDITING THEORY AND PRACTICE. (3)

Prerequisite, B.A. 122. Advanced auditing theory and practice and report writing.

### B.A. 128. ADVANCED COST ACCOUNTING. (2)

Prerequisite, B.A. 121. A continuation of basic cost accounting with special emphasis on process costs, standard costs, joint costs and by-product costs.

### B.A. 129. APPRENTICESHIP IN ACCOUNTING. (0)

Prerequisites, minimum of 20 semester hours in accounting and the consent of the accounting staff. A period of apprenticeship is provided with nationally known firms of certified public accountants from about January 15 to February 15, and for a semester after graduation.

### B.A. 130. BUSINESS STATISTICS I. (3)

Prerequisite, junior standing. Laboratory fee, \$10.00. An introductory course. Emphasis is placed upon statistical inference. Topics covered include statistical observations, frequency distributions, averages, measures of variability, elementary probability, sampling, distributions, problems of estimation, simple tests of hypotheses, index numbers, time series, graphical and tabular presentation. Selected applications of the techniques are drawn from economics, industrial management, marketing and accounting.

### B.A. 131. BUSINESS STATISTICS II. (3)

Prerequisite, B.A., 130. Laboratory fee, \$10.00. Estimation, tests of hypotheses, decision making, regression and correlation, contingency tables, analysis of variance, programming statistical problems for high speed computers.

### B.A. 132. SAMPLE SURVEYS IN BUSINESS AND ECONOMICS. (3)

Prerequisite, B.A. 130. Laboratory fee, \$10.00. A general course in scientific sample survey techniques. Review of elementary probability, characteristics of good estimators, errors of observation, simple random sampling, stratified random sampling, cluster sampling, comparison of various sample designs, cost functions, examples of actual survey practices.

### B.A. 134. STATISTICAL QUALITY CONTROL. (3)

Prerequisite, B.A. 130. Laboratory fee, \$10.00. Statistical fundamentals, theory construction and use of control charts, acceptance sampling by attributes and variables, work sampling and other industrial applications of statistics.

### B.A. 135. STATISTICAL ANALYSIS AND FORECASTING. (3)

Prerequisite, B.A. 130 or permission of instructor. Laboratory fee, \$10.00. A course exploring the usefulness of statistical methods in economic prediction. Various forecasting techniques in current use are examined. Major topics receiving detailed attention are the analysis of trends, seasonal patterns, cycles, and economic relationships. Some emphasis is placed on the predictive attributes of anticipations data, purchase plans, and other psychological variables. Considerable attention is also given to the logical aspects of the forecasting problem as distinct from its statistical side.

**B.A. 140. BUSINESS FINANCE. (3)**

Prerequisite, B.A. 21. This course deals with principles and practices involved in the organization, financing, and rehabilitation of business enterprises; the various types of securities and their use in raising funds, apportioning income, risk, and control; intercorporate relations; and new developments. Emphasis on solution of problems of financial policy faced by management.

**B.A. 141. SECURITY ANALYSIS. (3)**

Prerequisite, B.A. 140. A study of the principles and methods used in the analysis, selection, and management of investments, investment programs, sources of investment information, security price movements, government, real estate, public utility, railroad and industrial securities.

**B.A. 143. CREDIT MANAGEMENT. (3)**

Prerequisite, B.A. 140. A study of the nature of credit and the principles applicable to its extension and redemption for mercantile and consumer purposes; sources of credit information and analysis of credit reports; the organization and management of a credit department for effective control. Recent developments and effective legal remedies available.

**B.A. 148. ADVANCED FINANCIAL MANAGEMENT. (3)**

Prerequisite, B.A. 140. An advanced course in finance. Emphasis is placed upon the techniques employed by executives in their application of financial management practice to selected problems and cases. Critical classroom analysis is brought to bear upon actual methods and techniques used by business enterprises.

**B.A. 149. MARKETING PRINCIPLES AND ORGANIZATION. (3)**

Prerequisite, Econ. 32 or 37. This is an introductory course in the field of marketing. Its purpose is to give a general understanding and appreciation of the forces operating, institutions employed, and methods followed in marketing agricultural products, natural products, services, and manufactured goods.

**B.A. 150. MARKETING MANAGEMENT. (3)**

Prerequisite, B.A. 149. A study of the work of the marketing division in a going organization. The work of developing organizations and procedures for the control of marketing activities are surveyed. The emphasis throughout the course is placed on the determination of policies, methods, and practices for the effective marketing of various forms of manufactured products.

**B.A. 151. ADVERTISING. (3)**

Prerequisite, B.A. 149 or consent of instructor. A study of the role of advertising in the American economy; the impact of advertising on our economic and social life, the methods and techniques currently applied by advertising practitioners, the role of the newspaper, magazine, and other media in the development of an advertising campaign, modern research methods to improve the effectiveness of advertising, and the organization of the advertising business.

**B.A. 153. PURCHASING MANAGEMENT. (3)**

Prerequisite, B.A. 149. Determining the proper sources, quality and quantity of supplies, and methods of testing quality; price policies, price forecasting, forward buying, bidding and negotiation; budgets and standards of achievement. Attention is given to government purchasing and methods and procedures used in their procurement.

## BUSINESS ADMINISTRATION

### B.A. 154. RETAIL MANAGEMENT. (3)

Prerequisite, B.A. 20 and 149. Retail store organization, location, layout and store policy; pricing policies, price lines, brands, credit policies, records as a guide to buying; purchasing methods; supervision of selling; training and supervision of retail sales force; and administrative problems.

### B.A. 156. MARKETING RESEARCH METHODS. (3)

Prerequisites, B.A. 130 and B.A. 149. This course is intended to develop skill in the use of scientific methods in the acquisition, analysis and interpretation of marketing data. It covers the specialized fields of marketing research, the planning of survey projects, sample design, tabulation procedure and report preparation.

### B.A. 157. INTERNATIONAL MARKETING. (3)

Prerequisite, B.A. 149. Functions of various exporting agencies; documents and procedures used in exporting and importing transactions. Methods of procuring goods in foreign countries; financing of import shipments; clearing through the customs districts; and distribution of goods in the United States.

### B.A. 158. ADVERTISING MANAGEMENT. (3)

Prerequisite, B.A. 149. This course is concerned with the way in which business firms use advertising as a part of their marketing program. The case study method is used to present advertising problems taken from actual business practice. Cases studied illustrate problems in demand stimulation, media selection, advertising research, testing, and statistical control of advertising.

### B.A. 160. PERSONNEL MANAGEMENT I. (3)

This course deals with the problems of directing and supervising employees under modern industrial conditions. Two phases of personal administration are stressed, the application of scientific management and the importance of human relations in this field.

### B.A. 161. PERSONNEL MANAGEMENT II. (3)

Prerequisite or Corequisite, B.A. 160. Job evaluation and merit rating and other personnel management techniques generally employed in business.

### B.A. 163. LABOR RELATIONS. (3)

A study of the development and methods of organized groups in industry with reference to the settlement of labor disputes. An economic and legal analysis of labor union and employer association activities, arbitration, mediation, and conciliation; collective bargaining, trade agreements, strikes, boycotts, lockouts, company unions, employee representation, and injunctions.

### B.A. 164. LABOR LEGISLATION. (3)

Case method analysis of the modern law of industrial relations. Cases include the decisions of administrative agencies, courts and arbitration tribunals.

### B.A. 165. ADVANCED PRODUCTION MANAGEMENT. (3)

Prerequisite, B.A. 169. A study of typical problems encountered by the factory manager. The objective is to develop the ability to analyze and solve problems in management control of production and in the formulation of production policies. Among the topics covered are plant location, production planning and control, methods analysis and time study.

**B.A. 166. BUSINESS COMMUNICATIONS. (3)**

Prerequisite, junior standing. A systematic study of the principles of effective written communications in business. The fundamental aim is to develop the ability to write clear, correct, concise, and persuasive business letters and reports.

**B.A. 167. OPERATIONS RESEARCH I. (3)**

Prerequisite, B.A. 130 or consent of instructor. The philosophy, methods, and objectives of operations research. Basic methods are examined and their application to functional areas of business are covered.

**B.A. 168. MANAGEMENT AND ORGANIZATION THEORY. (3)**

The development of management and organization theory, nature of the management process and function and its future development. The role of the manager as an organizer and director, the communication process, goals and responsibilities.

**B.A. 169. PRODUCTION MANAGEMENT. (3)**

Studies the operation of a manufacturing enterprise, concentrating on the economies of production. Introduces a grounding in analytical method early so that the broad problem areas of system design, operation, and control can be based upon the analytical method.

**B.A. 170. PRINCIPLES OF TRANSPORTATION. (3)**

A general course covering the five fields of transportation, their development, service and regulation.

**B.A. 171. TRAFFIC AND PHYSICAL DISTRIBUTION MANAGEMENT. (3)**

Prerequisite, junior standing. Examines the management aspects of the business firm in moving their raw materials and finished goods, through traffic, warehousing, industrial packaging, material handling, and inventory. A systematic examination of the trade-off possibilities and management alternatives to minimize cost of product flow and maximizing customer service is provided.

**B.A. 172. MOTOR TRANSPORTATION. (3)**

Prerequisite, B.A. 170. The development and scope of the motor carrier industry, different types of carriers, economics of motor transportation, services available, federal regulation, highway financing, allocation of cost to highway users, highway barriers.

**B.A. 173. WATER TRANSPORTATION. (3)**

Prerequisite, B.A. 170. Water carriers of all types, development and types of services, trade routes, inland waterways, company organization, the American Merchant Marine as a factor in national activity.

**B.A. 174. COMMERCIAL AIR TRANSPORTATION. (3)**

Prerequisite, B.A. 170. The air transportation system of the United States: airways, airports, airlines. Federal regulation of air transportation. Problems and services of commercial air transportation; economics, equipment, operations, financing, selling of passenger and cargo services. Air mail development and services.

**B.A. 175. ADVANCED TRANSPORTATION PROBLEMS. (3)**

Prerequisite, B.A. 170. A critical examination of current government transportation policy and proposed solutions. Urban and intercity managerial transport problems are also considered.

## BUSINESS ADMINISTRATION

### B.A. 176. URBAN TRANSPORT AND URBAN DEVELOPMENT. (3)

Prerequisite, junior standing. An analysis of the role of urban transportation in present and future urban development. The interaction of transport pricing and service, urban planning, institutional restraints, and public land uses, is studied.

### B.A. 180. BUSINESS LAW. (3)

Legal aspects of business relationships, contracts, negotiable instruments, agency, partnership, corporations, real and personal property, and sales.

### B.A. 181. BUSINESS LAW. (3)

Legal aspects of business relationships, contracts, negotiable instruments, agency partnerships, corporations, real and personal property, and sales.

### B.A. 182. ADVANCED BUSINESS LAW. (3)

Designed primarily for CPA candidates. Legal aspects of wills, insurance, torts and bankruptcy. Offered only in Summer School.

### B.A. 184. PUBLIC UTILITIES. (3)

Prerequisites, Econ. 32 or 37. Using the regulated industries as specific examples attention is focused on broad and general problems in such diverse fields as constitutional law, administrative law, public administration, government control of business, advanced economic theory, accounting, valuation and depreciation, taxation, finance, engineering and management.

### B.A. 189. BUSINESS AND GOVERNMENT. (3)

Prerequisites, Econ. 32 or 37. A study of the role of government in modern economic life. Social control of business as a remedy for the abuses of business enterprise arising from the decline of competition. Criteria of limitations on government regulation of private enterprise.

### B.A. 190. RISK MANAGEMENT. (3)

Designed to acquaint the student with the nature and significance of risk in business enterprise. The problems relating to both pure and speculative risk in business are considered; and methods of solution involving risk assumption transfer, reduction, and the use of insurance are analyzed as aids in management decision making.

### B.A. 191. PRINCIPLES OF RISK AND INSURANCE. (3)

Emphasizes the use of insurance in resolving problems involving personal and business risks. Life, accident and health, fire and casualty, automobile, and marine insurance are examined as means of dealing with these risks. The theory and legal aspects of insurance are considered, as well as the quantitative measurement of risks.

### B.A. 195. REAL ESTATE PRINCIPLES. (3)

Prerequisite, Econ. 32 or 37. This course covers the nature and uses of real estate, real estate as a business, basic legal principles, construction problems and home ownership, city planning, and public control and ownership of real estate.

### B.A. 196. URBAN LAND MANAGEMENT. (3)

Covers the managerial and decision making aspects of urban land and property. Included are such subjects as land use and valuation matters.

**B.A. 198. STRUCTURE AND OPERATIONS OF INDUSTRIES. (3)**

Prerequisite, senior standing. The impact of technology and production policies on the economic, financial, marketing, and locational policies of representative industries. A background course for students in industrial and financial management, business economics, general business, and related areas.

**B.A. 199. BUSINESS POLICIES. (3)**

Prerequisite, senior standing. A case study course in which the aim is to have the student apply both what he has learned of general management principles and their specialized functional applications of the overall management function in the enterprise.

*For Graduates*

**B.A. 210. ADVANCED ACCOUNTING THEORY. (3)**

**B.A. 220. MANAGERIAL ACCOUNTING. (3)**

**B.A. 221, 222. SEMINAR IN ACCOUNTING. (1-6)**

**B.A. 226. ACCOUNTING SYSTEMS. (3)**

**B.A. 228. RESEARCH IN ACCOUNTING. (1-6)**

**B.A. 229. MANAGEMENT PLANNING AND CONTROL. (1-6)**

**B.A. 230. ADVANCED BUSINESS STATISTICS. (3)**

Prerequisite, B.A. 130 or consent of instructor. Laboratory fee, \$10.00. Bayesian decision processes and other statistical methods applicable to the operations of the business firm and the analysis of the economy. Methodological topics include a consideration of utility, expected values, estimation of probabilities, opportunity loss and cost of uncertainty, sampling, sequential decision procedures, and selected topics from classical statistics. Applications are made to the problems of inventory control, production, investment, and other business functions.

**B.A. 231. THEORY OF SURVEY DESIGN. (3)**

Prerequisite, B.A. 131 or B.A. 132, or consent of instructor. Laboratory fee, \$10.00. Theory of sampling from finite populations developed for various types of survey designs. Equi-probability selection methods. Unequal probabilities of selection. Consideration of the characteristics of particular types of estimators as well as cost functions in developing optimum designs.

**B.A. 234. MANAGERIAL ANALYSIS I. (3)**

Required of M.B.A. candidates.

The utilization of the scientific method in decision making. Various methodologies are utilized in order to evaluate and interpret findings for management action.

**B.A. 235. MANAGERIAL ANALYSIS II. (3)**

Designed to enable the student to go into greater depth in the use of analytical techniques. Where feasible, data processing is applied, and simulated experiences are provided. The aim is to encourage the development of the perceptive approach to complex business situations.

## **BUSINESS ADMINISTRATION**

### **B.A. 237. MANAGEMENT SIMULATION I. (3)**

Laboratory fee, \$10.00. Application of management principles to the solution of complex business problems. This is accomplished in conjunction with the use of computer facilities at the Computer Science Center on the campus.

### **B.A. 240. SEMINAR IN FINANCIAL MANAGEMENT. (1-6)**

M.B.A. candidates must take B.A. 220 or B.A. 240.

### **B.A. 242. FINANCIAL ADMINISTRATION. (3)**

The role of the financial manager in executive decision making. Financial planning, analysis, and control in such areas as the allocation of financial resources within the firm, forecasting and budgeting, cost and profit controls, capital budgeting and the bases for investment decisions, alternative sources of short-term and long-term financing and financial problems of growth.

### **B.A. 245. RESEARCH IN FINANCE. (1-6)**

### **B.A. 249. PROBLEMS IN FINANCIAL ADMINISTRATION.**

### **B.A. 250. PROBLEMS IN SALES MANAGEMENT. (1-6)**

### **B.A. 251. PROBLEMS IN ADVERTISING. (1-6)**

### **B.A. 252. PROBLEMS IN RETAIL MANAGEMENT. (1-6)**

### **B.A. 257. SEMINAR IN MARKETING MANAGEMENT. (3)**

### **B.A. 258. RESEARCH PROBLEMS IN MARKETING. (1-6)**

### **B.A. 259. BUSINESS LOGISTICS. (3)**

Involves the optimization of human and material resources by their proper application at the right time and place to support the business enterprise. Consideration is given to analysis of material and manpower requirements, production planning and scheduling, acquisition, inventory control, and distribution. The role of advanced planning and forecasting is considered in minimizing costs and securing the best combination of resources. Impact of technology upon the utilization of resources is considered.

### **B.A. 262. SEMINAR IN LABOR RELATIONS. (1-6)**

### **B.A. 264. BEHAVIORAL FACTORS IN MANAGEMENT. (3)**

Required of M.B.A. candidates.

A critical analysis of the impact of the behavioral sciences on traditional concepts of management as process and as organization. Included within the area of analysis are such subjects as human motivation, human relations, morale, status, role, organization, communication, bureaucracy, the executive role, leadership, and training.

### **B.A. 265. DEVELOPMENT AND TRENDS IN PRODUCTION MANAGEMENT. (3)**

### **B.A. 266. PERSONNEL RESEARCH: MANPOWER PROCUREMENT AND DEVELOPMENT. (1-6)**

### **B.A. 267. PERSONNEL RESEARCH: MANPOWER COMPENSATION AND EVALUATION. (1-6)**

### **B.A. 269. APPLICATION OF BEHAVIORAL SCIENCE TO BUSINESS. (1-6)**

Designed to enable the student to go into greater depth in the design and implementation of behavioral science research in business.

B.A. 270. RESEARCH IN TRANSPORTATION. (1-6)

B.A. 271. THEORY OF ORGANIZATION. (3)

B.A. 272. SEMINAR IN MANAGEMENT OF PHYSICAL DISTRIBUTION. (3)

B.A. 275. SPECIAL STUDIES IN TRANSPORTATION. (3)

B.A. 277. SEMINAR IN TRANSPORTATION. (3)

B.A. 280. SEMINAR IN BUSINESS AND GOVERNMENT. (3)

B.A. 281. PRIVATE ENTERPRISE AND PUBLIC POLICY. (3)

Examines the executive's social and ethical responsibilities to his employees, customers, and to the general public. Consideration is given to the conflicts occasioned by competitive relationships in the private sector of business and the effect of institutional restraints. The trends in public policy and their future effect upon management are examined. For comparative purposes, several examples of planned societies are considered.

B.A. 282. PRODUCT, PRODUCTION AND PRICING POLICY

(3) Required of M.B.A. Candidates.

The application of economics theory to the business enterprise in respect to the determination of policy and the handling of management problems with particular reference to the firm producing a complex line of products. Nature of competition. Pricing policy. Interrelationship of production and marketing problems. Basic types of cost. Control systems. Theories of depreciation and investment and the impact of each upon costs.

B.A. 283. MANAGEMENT POLICY FORMULATION. (3)

Affords an insight into the problems confronting top management. A complex management game supplemented by the case method, provides a simulated environment required for dynamic decision-making policy formulation.

B.A. 284. SEMINAR IN PUBLIC UTILITIES. (1-6)

B.A. 290. SEMINAR IN INSURANCE. (3)

B.A. 295. SEMINAR IN REAL ESTATE. (3)

B.A. 399. THESIS. (1-6)

## II. ECONOMICS

The program of studies in economics is designed to meet the needs of students who wish to concentrate either on a major or minor scale in this division of the social sciences. Students who expect to enroll in the professional schools and those who are planning to enter the fields of business, public administration, foreign service, or social service administration will find courses in economics of considerable value to them in their later work. A student of economics should choose courses to meet the requirements for his major objective. If he expects to pursue graduate study, he should consult Graduate School Announcements for the general requirements for advanced degrees.

## ECONOMICS

### REQUIREMENTS FOR THE ECONOMICS MAJOR

In addition to the University requirements in General Education (see page 2), the student majoring in economics is required to complete a minimum of 36 semester hours in economics with an average grade of not less than "C." Required courses are Econ. 4, 31, 32, 102, and 132, and B.A. 130 (Statistics). A student will normally have earned nine semester hours credit in the lower division courses in economics prior to beginning advanced work in the junior year. These lower division courses must be completed with an average grade of not less than "C." Economics 102 and 132 are normally taken in the junior year since they provide a theoretical foundation for other economics courses.

Other courses in economics to meet the requirements of the major are to be selected with the aid of a faculty adviser. Business Administration courses which may count as economics credit are B.A. 130, 131, 132, 134, 135, 164, and 184.

Economics majors enrolled in the College of Arts and Sciences must, of course, fulfill all of the specific requirements of that College; these include, for example, work in a foreign language and 7-8 semester hours of credit in natural science. All economics majors must take six semester hours of mathematics.

Economics majors enrolled in the College of Business and Public Administration may elect to take a foreign language or, in lieu of foreign language, may take B.A. 10 and Geog. 15.

Economics majors are free to choose electives in other colleges of the University and are encouraged to study broadly in the social sciences, philosophy, mathematics, statistics, and accounting. Economics majors planning to do graduate work are advised to develop proficiency in mathematics through the calculus and in a foreign language.

An economics honors program is open to economics majors entering their junior year. Students must have an academic average of at least 3.0 to be eligible for admittance to this program.

### SUGGESTED STUDY PROGRAM FOR ECONOMICS MAJOR

<i>Freshman Year</i>	<i>(Semester)</i>	
	<i>I</i>	<i>II</i>
Eng. 1—Composition and American Literature .....	3	..
Math. 10, 11 or 19, 20 .....	3-4	3-4
Econ. 4—Economic Developments .....	3	..
Social Science Elective .....	3	3
Fine Arts or Philosophy Elective .....	..	3
Foreign Language or B.A. 10 and Elective .....	3	3
Hea. 5—Science and Theory of Health (men and women) ..	2	..
Physical Activities (men and women) .....	1	1
Free Elective .....	..	3
Total .....	18-19	16-17

## ECONOMICS

	(Semester—)	
	I	II
<i>Sophomore Year</i>		
Eng. 3, 4—Composition & World Literature.....	3	3
Econ. 31, 32—Principles of Economics.....	3	3
Foreign Language or Geog. 15 and elective.....	3	3
Natural Science (one biological and one physical).....	3-4	3-4
History .....	3	3
	<hr/>	<hr/>
Total.....	15-16	15-16
<i>Junior Year</i>		
Econ. 102—National Income Analysis .....	..	3
Econ. 132—Intermediate Price Theory .....	3	..
Econ. 140—Money and Banking.....	3	..
Econ. 160—Labor Economics.....	3	..
B.A. 130—Business Statistics I .....	..	3
Econ. 131—Comparative Economic Systems.....	..	3
Electives in Economics and other subjects <sup>2</sup> .....	6	6
	<hr/>	<hr/>
Total.....	15	15
<i>Senior Year</i>		
Econ. 148—International Economics.....	3	..
Econ. 142—Public Finance and Taxation.....	..	3
Electives in Economics and other subjects <sup>2</sup> .....	12	12
	<hr/>	<hr/>
Total.....	15	15

## ECONOMICS

*Professors:* DILLARD, CUMBERLAND, GRUCHY, O'CONNELL, SCHULTZE, AND ULMER.

*Associate Professors:* BERGMANN, DODGE, KNIGHT, WEINSTEIN AND WONNACOTT.

*Assistant Professors:* J. Q. ADAMS, R. F. ADAMS, BENNETT, CANTERBURY, DORSEY, GREEN, HEXTER, HINRICHS, MAYOR, MEYER, SNOW.

*Instructors:* BAILEY, CHASE, FUREY, HAMILTON, PEAKE, VAN BEEK, WEINTRAUB.

*Lecturers:* AMUZEGAR, CONRAD, DAY, GIBNEY, GRAMLEY, MEASDAY, MUELLER, SPIEGEL.

### ECON. 4. ECONOMIC DEVELOPMENTS. (3)

First and second semesters. Freshman requirement in business administration curriculums. An introduction to modern economic institutions—their origins,

---

<sup>2</sup> Normally these electives must be on the junior-senior level.

## ECONOMICS

development, and present status. Commercial revolution, industrial revolution, and age of mass production. Emphasis on developments in England, Western Europe and the United States. (Dillard, Snow, Staff.)

### ECON. 31, 32. PRINCIPLES OF ECONOMICS. (3, 3)

First and second semesters. Prerequisite, sophomore standing. Required in the business administration curriculums. In Econ. 31 basic concepts, the monetary system, the national accounts, national income analysis, and business cycles are introduced. In Econ. 32 emphasis is placed on price theory, distribution, international trade, and economic development. (Staff.)

### ECON. 37. FUNDAMENTALS OF ECONOMICS. (3)

First and second semesters. Not open to students who have credit in Econ. 31 and 32. Not open to freshmen or to B.P.A. students. A survey of the general principles underlying economic activity; analysis of leading economic problems in the modern world. This is the basic course in economics for students who are unable to take the more complete course provided in Econ. 31 and 32. (Ulmer, Canterbury.)

## *For Graduates and Advanced Undergraduates*

### ECON. 102. NATIONAL INCOME ANALYSIS. (3)

First and second semesters. Prerequisite, Econ. 32. Required for economics majors. An analysis of national income accounts and the level of national income and employment. (Mayor.)

### ECON. 103. AMERICAN ECONOMIC DEVELOPMENT. (3)

First and second semester. Prerequisite, Econ. 32 or 37. A study of long-term trends in the American economy. The transplantation of economic institutions from western Europe; the take-off period in United States economic growth; trends in productivity, prices, national income, savings and investment. The welfare state and the mixed economy. (Bailey.)

### ECON. 105. INTRODUCTION TO ECONOMIC DEVELOPMENT OF UNDER-DEVELOPED AREAS. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. An analysis of the economic and social characteristics of underdeveloped areas. Recent theories of economic development; obstacles to development; policies and planning for development. (Hinrichs, J. Q. Adams.)

### ECON. 106. ECONOMIC DEVELOPMENT OF SELECTED AREAS. (3)

Prerequisite, Econ. 105. Institutional characteristics of a specific area are discussed and alternative strategies and policies for development are analyzed. (Bennett.)

### ECON. 130. MATHEMATICAL ECONOMICS. (3)

First semester. Prerequisites, Econ. 102 and 132 and one year of mathematics. A course designed to enable economics majors to understand the simpler aspects of mathematical economics. Those parts of the calculus and algebra required for economic analysis will be presented. (Ulmer, Hexter.)

### ECON. 131. COMPARATIVE ECONOMIC SYSTEMS. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. An investigation of the theory and practice of various types of economic systems. An examination

and evaluation of the capitalistic system followed by an analysis of alternative types of economic systems such as fascism, socialism, and communism.

(Gruchy, Dodge, Amuzegar.)

### ECON. 132. INTERMEDIATE PRICE THEORY. (3)

First and second semesters. Prerequisite, Econ. 32. Required for economics majors. This course is an analysis of price and distribution theory with special attention to recent developments in the theory of imperfect competition.

(Knight, Day, Hexter.)

### ECON. 134. CONTEMPORARY ECONOMIC THOUGHT. (3)

Prerequisites, Econ. 32 and senior standing. Graduate students should take Econ. 232. A survey of recent trends in American, English, and Continental economic thought with special attention to the work of such economists as W. C. Mitchell, J. R. Commons, T. Veblen, W. Sombart, J. A. Hobson and other contributors to the development of economic thought since 1900.

(Gruchy.)

### ECON. 137. THE ECONOMICS OF NATIONAL PLANNING. (3)

Prerequisite, Econ. 32 or 37 and senior standing. An analysis of the principles and practice of economic planning with special reference to the planning problems of western European countries and the United States.

(Gruchy.)

### ECON. 138. ECONOMICS OF THE SOVIET UNION. (3)

Second semester. Prerequisite, Econ. 32 or 37. An analysis of the organization, operating principles and performance of the Soviet economy with attention to the historical and ideological background, planning, resources, industry, agriculture, domestic and foreign trade, finance, labor, and the structure and growth of national income.

(Dodge.)

### ECON. 140. MONEY AND BANKING. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. A study of the relation of money and credit to economic activity and prices; the impact of public policy in financial markets and in markets for goods and services; policies, structure, and functions of the Federal Reserve System; organization, operation, and functions of the commercial banking system, as related particularly to questions of economic stability and public policy.

(Bennett, Meyer, Staff.)

### ECON. 141. THEORY OF MONEY, PRICES AND ECONOMIC ACTIVITY. (3)

Second semester. Prerequisite, Econ. 140. A theoretical treatment of the influence of money and financial markets on economic activity and prices, and of the effects of monetary policy on the markets for goods and services; the role of money in the classical and Keynesian macro-systems; topics of theoretical interest in monetary policy formation and implementation.

### ECON. 142. INTRODUCTION TO PUBLIC FINANCE. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. A study of the issues in mobilizing resources to meet public wants through federal, state, and local governments; principles and policies of taxation, debt management, and governmental expenditures and their effects on resource allocation, stabilization of income and prices, income distribution and economic growth.

(Hinrichs, Dorsey, Meyer.)

### ECON. 143. THEORY OF PUBLIC FINANCE. (3)

Second semester. Prerequisite, Econ. 142 and 102, or consent of instructor. Advanced analysis of the theory and practice of public finance, including taxation, debt management, expenditures, and fiscal policy.

(Hinrichs.)

## ECONOMICS

### ECON. 144. STATE AND LOCAL PUBLIC FINANCE. (3)

Prerequisite, Econ. 32 or 37. Principles and problems of governmental finance with special reference to state and local jurisdictions. Topics to be covered include taxation, expenditures, and intergovernmental fiscal relations.

(R. F. Adams.)

### ECON. 147. BUSINESS CYCLES. (3)

First semester. Prerequisite, Econ. 140. A study of the causes of depressions and unemployment, cyclical and secular instability, theories of business cycles, and the problem of controlling economic instability.

(Mayor.)

### ECON. 148. INTERNATIONAL ECONOMICS. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. A descriptive and theoretical analysis of international trade; balance of payments accounts; the mechanism of international economic adjustment; comparative costs; economics of customs unions.

(Wonnacott, Canterbury.)

### ECON. 149. INTERNATIONAL ECONOMIC POLICIES. (3)

Second semester. Prerequisite, Econ. 148. Contemporary balance of payments problems; the international liquidity controversy; investment, trade and economic development; evaluation of arguments for protection.

(Wonnacott.)

### ECON. 160. LABOR ECONOMICS. (3)

First and second semesters. Prerequisite, Econ. 32 or 37. The historical development and chief characteristics of the American labor movement are first surveyed. Present-day problems are then examined in detail: wage theories, unemployment, social security, labor organization, and collective bargaining.

(Knight, Dorsey, Weinstein.)

### ECON. 161. CURRENT PROBLEMS IN LABOR ECONOMICS. (3)

Prerequisite, Econ. 160. A detailed examination of current problems in labor economics including; labor market and manpower problems, unemployment compensation and social security, wage theories, and productivity analysis.

(Weinstein, Dorsey.)

### ECON. 170. INDUSTRIAL ORGANIZATION. (3)

Prerequisite, Econ. 32 or 37. Changing structure of the American economy; price policies in different industrial classifications of monopoly and competition in relation to problems of public policy.

(Snow.)

### ECON. 171. ECONOMICS OF AMERICAN INDUSTRIES. (3)

Second semester. Prerequisite, Econ. 32 or 37. A study of the technology, economics and geography of representative American industries.

(Measday.)

### ECON. 196, 197. HONORS SEMINAR. (3, 3)

First and second semesters. Normally taken in the junior year. Prerequisite, candidacy for honors in Economics. Selected topics are investigated, and written reports are submitted.

(Gruchy.)

### ECON. 198. INDEPENDENT HONORS STUDY. (3)

First semester. Normally taken in the senior year. Prerequisites, Economics 196, 197 and candidacy for honors in Economics. Integrated reading under staff direction, leading to the preparation of a thesis in Economics 199.

(Staff)

### ECON. 199. HONORS THESIS. (3)

Second semester. Prerequisites, Economics 198 and candidacy for honors in Economics. General supervision will be provided through assembled meetings with the professor in charge of the course.

(Staff.)

*For Graduates***ECON. 200. MICRO-ECONOMIC ANALYSIS. (3)**

First semester. Prerequisite, Econ. 132. A critical analysis of the theory of economic decision-making in the firm, household, and industry in perfect and imperfect competition; price, output, distribution and the theory of general equilibrium. Review of recent contributions. (Ulmer, Weinstein.)

**ECON. 201. ADVANCED MICRO-ECONOMIC ANALYSIS. (3)**

Second semester. Prerequisite, Econ. 200 or consent of instructor. Continuation of Econ. 200 with particular attention to recent developments in linear programming, game theory, activity analysis, welfare economics, input-output analysis, and micro-dynamic models. (Ulmer.)

**ECON. 202. MACRO-ECONOMIC ANALYSIS. (3)**

Second semester. Prerequisite, Econ. 102. National income accounting; determination of national income and employment especially as related to the modern theory of effective demand; consumption function; multiplier and acceleration principles; the role of money as it affects output and employment as a whole. (Schultze, Bergmann.)

**ECON. 203. SEMINAR IN AMERICAN ECONOMIC DEVELOPMENT. (3)**

Prerequisite, Graduate standing. Selected topics in the long-term movements of the American economy.

**ECON. 204. ORIGINS AND DEVELOPMENT OF CAPITALISM. (3)**

First semester. Study of the transition from feudalism to capitalism and the subsequent development of leading capitalist institutions in industry, agriculture, commerce, banking, and the social movement. (Dillard.)

**ECON. 205. ECONOMIC DEVELOPMENT OF UNDERDEVELOPED AREAS. (3)**

First semester. Prerequisite, Econ. 105, or Econ. 102 and Econ. 132, or consent of instructor. Principles and problems of economic developments in underdeveloped areas; policies and techniques which hasten economic development. (Bennett.)

**ECON. 206. SEMINAR IN ECONOMIC DEVELOPMENT. (3)**

Second semester. Prerequisite, Econ. 205 or consent of instructor. Problems and policies of economic development in specified under-developed areas. (Bennett.)

**ECON. 207. MONEY AND FINANCE IN ECONOMIC DEVELOPMENT. (3)**

(Hinrichs.)

**ECON. 211. QUANTITATIVE ECONOMICS I. (3)**

Prerequisites, Econ. 102, 132, and a year of college mathematics. Not open to students who have credit in Econ. 130, Mathematical Economics. The use of mathematics in the formulation and derivation of economic theories and the construction of economic models. Calculus and matrix algebra required for economics will be taught as needed. (Green, Hexter.)

**ECON. 212. QUANTITATIVE ECONOMICS II. (3)**

Prerequisite, Econ. 211 and one year of Statistics. Required of all Ph.D. majors in Economics. Theory of probability and mathematical statistics as a foundation for empirical economic studies. (Bergmann.)

## ECONOMICS

### ECON. 214. ADVANCED MATHEMATICAL ECONOMICS. (3)

Second semester. Prerequisite, either one year of calculus or Econ. 130. Model-building and mathematical derivation of micro- and macro-economic theories. Further topics in differential and difference equations and in matrix algebra introduced as required. (Ulmer.)

### ECON. 217. ECONOMETRICS I. (3)

Prerequisite, Econ. 212. A first course in the principles of econometrics. (Green, Hexter.)

### ECON. 218. ECONOMETRICS II. (3)

Prerequisite Econ. 217 or equivalent. Advanced theory and applications of econometrics. Supervised research. (Green.)

### ECON. 220. REGIONAL ANALYSIS AND LOCATION THEORY. (3)

Prerequisite, Graduate standing, permission of the instructor. Location theory and the spatial distribution of economic activity. The application to regional and interregional problems of analytic methods, such as input-output techniques, linear programming, social accounts, gravity models, industrial complex analysis, money flows, and balance of payments.

### ECON. 230. HISTORY OF ECONOMIC THOUGHT. (3)

First semester. Prerequisite, Econ. 132 or consent of instructor. A study of the development of economic thought and theories including the Greeks, Romans, canonists, mercantilists, physiocrats, Adam Smith, Malthus, Ricardo. Relation of ideas to economic policy. (Dillard, Spiegel.)

### ECON. 231. ECONOMIC THEORY IN THE NINETEENTH CENTURY. (3)

Second semester. Prerequisite, Econ. 230 or consent of the instructor. A study of various nineteenth and twentieth century schools of economic thought, particularly the classicists, neo-classicists, Austrians, German historical school, American economic thought and the socialists. (Dillard, Spiegel.)

### ECON. 232, 233. SEMINAR IN INSTITUTIONAL ECONOMIC THEORY. (3, 3)

A study of the recent developments in the field of institutional economic theory in the United States and abroad. (Gruchy.)

### ECON. 234. ECONOMIC GROWTH IN MATURE ECONOMIES. (3)

Analysis of policies and problems for achieving stable economic growth in mature economies such as the United States, the United Kingdom, and the Scandinavian countries. (Gruchy.)

### ECON. 235. ADVANCED INTERNATIONAL ECONOMICS. (3)

First semester. General equilibrium and disequilibrium in the world economy; international mechanism and adjustment; price, exchange rate, and income changes. Commercial policy and the theory of customs unions. (Wonnacott.)

### ECON. 236. SEMINAR IN INTERNATIONAL ECONOMIC RELATIONS. (3)

Second semester. A study of selected problems in international economic relations. (Wonnacott.)

### ECON. 237. SELECTED TOPICS IN ECONOMICS. (3)

### ECON. 238. SEMINAR IN ECONOMIC DEVELOPMENT OF THE SOVIET UNION. (3)

Prerequisite, Econ. 138 or consent of instructor. Measurement and evaluation of Soviet economic development including interpretation and use of Soviet statistics, measurement of national income and rates of growth, fiscal and

monetary policies, investment and technological change, planning and economic administration, manpower and wage policies, foreign trade and aid, and selected topics in Bloc development. (Dodge.)

**ECON. 240. MONETARY THEORY AND POLICY. (3)**

First semester. An adequate knowledge of micro- and macro-economics is assumed. Theory of money, financial assets, and economic activity; review of classical, neo-classical and Keynesian contributions; emphasis on post-Keynesian contributions, including those of Tobin, Patinkin, Gurley-Shaw, Friedman, and others. (Gramley.)

**ECON. 241. SEMINAR IN MONETARY THEORY AND POLICY. (3)**

Second semester. Prerequisite, Econ. 240 or consent of instructor. Theory of the mechanisms through which central banking affects economic activity and prices; formation and implementation of monetary policy; theoretical topics in monetary policy. (Gramley.)

**ECON. 242. ADVANCED THEORY OF PUBLIC FINANCE. (3)**

First semester. Prerequisite, Econ. 143 or consent of instructor. Theories of taxation, debt management, and fiscal policy. Students are assumed to have a working knowledge of micro- and macro-economic analysis. (Hinrichs, Dorsey.)

**ECON. 243. SEMINAR IN PUBLIC FINANCE. (3)**

Second semester. Prerequisite, Econ. 242. Theory of public expenditures with special attention to recent contributions; economic analysis of the theory and practice of public finance in various settings. (Schultze.)

**ECON. 247. ECONOMIC GROWTH AND INSTABILITY. (3)**

Second semester. An analytical study of long-time economic growth in relation to short-term cyclical instability. Attention is concentrated on the connection between accumulation of capital and the capital requirements of secular growth and business cycles. Earlier writings as well as recent growth models are considered. (Schultze, Mayor.)

**ECON. 248 THE ECONOMICS OF TECHNICAL CHANGE. (3)**

Prerequisite, consent of instructor. A study of the determinants and impact of inventions and innovations. Attention is given to the qualitative and quantitative aspects of technical change, both at the micro-economic and macro-economic levels, and under different conditions of economic development.

**ECON. 260. SEMINAR IN LABOR ECONOMICS. (3)**

Prerequisite, Econ. 160 or consent of instructor. Theories of wage determination, including analysis of wage structures and wage-price spiral; organization of labor markets, including factors influencing labor mobility and unemployment. (Knight.)

**ECON. 261. SELECTED TOPICS IN LABOR ECONOMICS. (3)**

Prerequisite, Econ. 160 or consent of instructor. A detailed analysis of selected topics in labor economics, including organization of labor markets, manpower utilization and development, labor force analysis, labor mobility and theories of unemployment. (Weinstein, Dorsey.)

**ECON. 270. ADVANCED INDUSTRIAL ORGANIZATION. (3)**

(Mueller, Snow.)

**ECON. 399. THESIS.**

(Arranged.)

### III. GEOGRAPHY

Geography embraces both physical and social science aspects, and in geographical research these two aspects are related constantly. The geographer studies man's physical environment — landforms, climate, nature and distribution of physical resources, etc.—and its relationships to man's major economic and other activities, particularly as they find expression in the landscape. He is especially interested in the regional diversity of the world in its various and changing patterns and the physical and socio-economic causes which contribute to such diversity.

Thus a geographer should have a background in certain aspects of the physical and of the social sciences. This is reflected in both the undergraduate and graduate programs of study. First hand observation is also still of prime importance to the modern geographer, as it was to the old "scientific travel geographer," and parts of many types of geographical research work are carried out in the field. Therefore, a certain amount of training in field observation is essential for the geographer. Major tools in his work are air photographs and many different types of maps.

#### REQUIREMENTS FOR AN UNDERGRADUATE MAJOR IN GEOGRAPHY

There are 3 different undergraduate programs in geography:

1. *The general program.* This program prepares a student for work as a geographer in Federal and State government, business and various kinds of teaching, and for later advanced work in geography.
2. *The urban geography program.* This program prepares a student for work as a geographer in State, County, Municipal and other planning agencies.
3. *The cartography program.* This program prepares a student for work as a cartographer in Federal and State government, planning and private business.

The curriculum for an undergraduate major in geography is designed to give the student an understanding of the geographic factors that play a major role in creating differences between geographic regions and countries, and to show how such factors may affect economic, social, and political activities. The student will be taught the fundamentals of map making, field work, and geographic analysis. Special orientation toward the work of a geographer in urban and suburban planning or toward cartography is possible within the framework of the undergraduate major.

Openings for well trained geographers exist in many branches of the Federal government and of State governments, in planning agencies, in private business, and in high schools, colleges and universities. For the

higher positions in government and planning, study toward an M.A. may be desirable. Colleges and universities generally require M.A. and Ph.D. degrees.

A student majoring in geography is required to complete satisfactorily 120 semester hours of work in addition to the required work in hygiene, and physical activities. A general average of at least "C" is required for graduation. Only courses in which the student receives a grade of "C" or above will be counted toward the major.

The specific requirements for the geography major are:

I. Geog. 10 and 11 (3, 3) or equivalent; Geog. 30 (3); Geog. 35 (3); Geog. 40 and 41 (3, 3); Geog. 170 (3) and 18 hours in other geography courses numbered 100 to 199, of which 6 hours must be in non-regional courses; a total of 39 hours in geography.

II. Social Sciences—G. & P. 1 (3); Econ. 31 and 32 (3,3); Hist. (3,3); one course in U.S. history, one in another area; Soc. 105 (3); a total of 18 semester hours.

III. Natural Sciences and Mathematics—Botany 1 and 113 or 102 (4, 2 or 3); Agron. 114 or equivalent (4); Chem. 1 (4); Math. 3 (4) or Math 10 (3). Total of 18 or 19 semester hours.

IV. English and Speech—Eng. 1 (3) and 3, 4, (3, 3); Speech 1 (3) or 7 (2); a total of 11 or 12 semester hours.

V. Foreign Language and Literature—12 semester hours in one language, unless an advanced course is taken.

VI. Fine Arts or Philosophy—Phil. 41 (3), a total of 3 hours.

VII. Hygiene, and physical activities. The present University requirement is 4 semester hours in physical activities and health education.

A student who elects geography as a major must have earned eighteen semester hours credit in the prerequisite courses in geography prior to beginning the advanced work of the junior year. These are normally taken during the freshman and sophomore years. Only courses in which the student receives a grade of "C" or above will be counted toward the major.

A minor in geography should consist of Geog. 10 (3), Geog. 30 (3), Geog. 40 (3) and such other courses as the major adviser deems suitable.

The specific courses comprising the student's program of studies should be selected with the aid of a faculty adviser from the Department of Geography in terms of the student's objective and major interest.

## GEOGRAPHY

### RECOMMENDED STUDY PROGRAM FOR GEOGRAPHY MAJORS

<i>Freshman Year</i>	<i>(Semester)</i>	
	<i>I</i>	<i>II</i>
Geog. 10, 11—General Geography.....	3	3
Chem. 1—General Chemistry.....	4	..
Bot. 1—General Botany.....	..	4
Speech 1 or 7—Public Speaking.....	..	2-3
G. & P. 1—American Government.....	3	..
Eng. 1—(or 21) Composition.....	3	..
Foreign Language.....	3	3
Phil. 41—Elementary Logic and Semantics.....	..	3
Heal. 5—Health Education.....	..	2
Physical Activities (men and women).....	1	1
Total.....	17	18-19
<i>Sophomore Year</i>		
Geog. 30—Principles of Morphology.....	3	..
Geog. 35—Map Reading and Interpretation.....	..	3
Geog. 40—Principles of Meteorology.....	3	..
Geog. 41—Introductory Climatology.....	..	3
Hist.—One U. S. history and one other area.....	3	3
Eng. 3, 4—Composition and World Literature.....	3	3
Foreign Language.....	3	3
Math. 3 or 10—Fundamentals of Mathematics or Introduction to Mathematics.....	3-4	..
Total.....	18-19	15
<i>Junior Year</i>		
Bot. 113—Plant Geography.....	2	..
Agron. 114—Soil Classification and Geography.....	..	4
Soc. 105—Cultural Anthropology.....	..	3
Econ. 31, 32—Principles of Economics.....	3	3
Geog.—Selection to fit student's needs.....	6	3
Electives, with adviser's consent.....	6	3
Total.....	17	16
<i>Senior Year</i>		
Geog. 170—Local Field Course.....	3	..
Geog. 199—Thesis Research for undergraduate majors in geography.....	..	3
Geog.—Selection to fit student's needs.....	6	3
Electives, with adviser's consent (one of which should be a Social Science).....	6	3
Total.....	15	9

## SUGGESTED STUDY PROGRAM FOR URBAN GEOGRAPHY

In recent years there has been an increased demand in the field of Urban and Suburban Planning for *persons with basic preparation in Geography*, including work in cartography and urban geography, and with supporting preparation in Business Administration, Economics, Government and Politics, and Sociology. The following program has been organized in response to this demand, and in consultation with leading members of planning organizations in this part of the country. The program corresponds closely to the general geography major, but most elective hours are assigned to specific courses.

Attention is drawn to the fact that for this course of study no foreign language is required, but that persons wishing to pursue later a course toward the M.A. degree in geography must at that time offer 12 credit hours of an approved foreign language, or pass an examination.

<i>Freshman Year</i>	<i>Semester</i>	
	<i>I</i>	<i>II</i>
Geog. 10, 11—General Geography .....	3	3
Geog. 30—Principles of Morphology .....	3	..
Geog. 35—Map Reading and Interpretation .....	..	3
Chem. 1—General Chemistry .....	4	..
Bot. 1—General Botany .....	..	4
G. & P. 1—American Government .....	3	..
Soc. 1—Sociology of American Life .....	..	3
Eng. 1—Composition .....	3	..
Phil. 41—Elementary Logic and Semantics .....	..	3
Hea. 5—Health Education .....	..	2
Physical Activities (men and women) .....	1	1
Total .....	17	19

*Sophomore Year*

Geog. 40—Principles of Meteorology .....	3	..
Geog. 41—Introductory Climatology .....	..	3
Econ. 31, 32—Principles of Economics .....	3	3
Hist.—One U. S. history and one other area .....	3	3
Soc. 13—Rural Sociology .....	3	..
Soc. 14—Urban Sociology .....	..	3
Eng. 3, 4—Composition and World Literature .....	3	3
Speech 1 or 7—Public Speaking .....	..	2-3
Math. 3 or 10—Fundamentals of Mathematics or Introduction to Mathematics .....	..	3-4
Total .....	18-19	17-18

## GEOGRAPHY

	Semester	
	I	II
<i>Junior Year</i>		
Geog. 100—Regional Geography of Eastern Anglo-America	..	3
Geog. 155—Problems and Practices of Photo Interpretation	3	..
Geog. 195—Geography of Transportation	..	3
Geog. 197—Urban Geography	3	..
Agron. 114—Soil Classification and Geography	..	4
B. A. 130—Business Statistics I	3	..
Econ. 142—Public Finance and Taxation	3	..
B.A. 176—Urban Transport and Urban Development	..	3
Soc. 121—Population	3	..
Electives, with adviser's consent	..	2
Total	15	15
<i>Senior Year</i>		
Geog. 154, 155—General Cartography and Graphics	3	3
Geog. 170—Local Field Course	3	..
B. A. 195—Real Estate Principles	3	..
G. & P. 161—Metropolitan Administration	3	..
Soc. 114—The City	3	..
Geog. 199—Thesis Research for undergraduate majors in geography	..	3
Electives, with adviser's consent	..	5
Total	15	11

Electives during the Junior and Senior years should be chosen from among the following courses: Geog. 160—Advanced Economic Geography I. Agricultural Resources (3); Geog. 161—Advanced Economic Geography II. Mineral Resources (3); Geog. 198—Topical Investigations (1-3); B.A. 170—Transportation Services and Regulations (3); B.A. 184—Public Utilities (3); B.A. 180, 181—Business Law (4, 4); Econ. 150—Marketing Principles and Organization (3); Econ. 171—Economics of American Industries (3); Econ. 137—The Economics of National Planning (3); G. & P. 112—Public Financial Administration (3); G. & P. 181—Administrative Law (3); Soc. 112—Rural-Urban Relations (3); Soc. 115—Industrial Sociology (3); Soc. 183—Social Statistics (3).

## SUGGESTED STUDY PROGRAM FOR CARTOGRAPHY

There is a steady demand from Federal government, local government, planning agencies, and private firms for well trained geographic cartographers. A good geographic cartographer should understand the principles of geography and geographic research, as much cartographic work deals with the research that is necessary even before the first sketch of a map can be made. He should understand the principles and some of the problems of modern map making, general graphic presentation, and methods of reproduction; he should be able to do satisfactory cartographic drafting. The suggested program is essentially similar to that for the

undergraduate major except that students specializing in the cartographic side of geography may, with the consent of the Senior Adviser, enroll for Econ. 37 (3) instead of Econ. 31 and 32 (3, 3). Moreover, the Senior Adviser may also release such students from the requirement to take Soc. 105.

The student should take as many of the courses from Geog. 150 to and including Geog. 155 as are available during his upper classman years. Courses outside of geography, which can be expected to be most useful to his future cartography career, should be chosen in consultation with the Senior Adviser.

## GEOGRAPHY

*Professors:* HU, VAN ROYEN.

*Associate Professors:* AHNERT, CHAVES AND DESHLER.

*Assistant Professors:* ANDERSON, GORDON, MIKA, SCHMIEDER AND WIEDEL.

*Lecturers:* GROVES, VOLK.

*Instructor:* KINERNEY.

### GEOG. 10, 11. GENERAL GEOGRAPHY. (3, 3)

First and second semesters. Geog. 10 is suggested for students of Arts and Sciences, Education and those who desire a preparation for further study in geography. It also will serve as a preparation for the regional studies. Geog. 10 and 11 are required of all majors in geography and are recommended for minors. First part: an introduction to the various subdivisions of geography, to the nature and use of maps, to major principles and basic terminology. Second part: a study of the philosophy, techniques, aspects of literature and applications of geography. (Deshler and others.)

### GEOG. 15. INTRODUCTORY ECONOMIC GEOGRAPHY. (3)

First and second semesters. Two lectures and one two-hour laboratory period per week. A study of physical and economic factors that underlie production. The roles of climate, soils, and landforms; the nature and geographic distribution of agricultural, power and mineral resources, and the nature and uses of cartographic materials. (Staff.)

### GEOG. 20, 21. ECONOMIC GEOGRAPHY. (3, 3)

(Not offered on College Park campus.)

### GEOG. 30. PRINCIPLES OF MORPHOLOGY. (3)

First semester. A study of the physical features of the earth's surface and their geographic distribution, including subordinate land forms. Major morphological processes, the development of land forms, and the relationships between various types of land forms and land use problems. (Ahnert.)

## GEOGRAPHY

### GEOG. 35. MAP INTERPRETATION AND MAP PROBLEMS. (3)

First and second semesters. Interpretation of land forms and man-made features on American and foreign maps. Functions, use, and limitations of various types of maps, with emphasis upon topographic maps. Problems of use and interpretation. (Ahnert.)

### GEOG. 40. PRINCIPLES OF METEOROLOGY. (3)

First and second semesters. An introductory study of the weather. Properties and conditions of the atmosphere, and methods of measurement. The atmospheric circulation and conditions responsible for various types of weather and their geographic distribution patterns. Practical applications. (Kinerney.)

### GEOG. 41. INTRODUCTORY CLIMATOLOGY. (3)

Second semester. Prerequisite, Geog. 40, or permission of the instructor. Climatic elements and their controls, the classification and distribution of world climates and relevance of climatic differences to human activities. (Chaves.)

### *For Graduates and Advanced Undergraduates*

### GEOG. 100. REGIONAL GEOGRAPHY OF EASTERN ANGLO-AMERICA. (3)

Prerequisite, Geog. 10 or Geog. 15, or permission of the instructor. A study of the cultural and economic geography and the geographic regions of eastern United States and Canada, including an analysis of the significance of the physical basis for present-day diversification of development, and the historical geographic background.

### GEOG. 101. REGIONAL GEOGRAPHY OF WESTERN ANGLO-AMERICA. (3)

Prerequisite, Geog. 10 or Geog. 15, or permission of the instructor. A study of western United States, western Canada, and Alaska along the lines mentioned under Geog. 100.

### GEOG. 103. GEOGRAPHIC CONCEPTS AND SOURCE MATERIALS. (3)

A comprehensive and systematic survey of geographic concepts designed exclusively for teachers. Stress will be placed upon the philosophy of geography in relation to the social and physical sciences, the use of the primary tools of geography, source materials, and the problems of presenting geographic principles.

### GEOG. 104. GEOGRAPHY OF MAJOR WORLD REGIONS. (3)

A geographic analysis of the patterns, problems, and prospects of the world's principal human-geographic regions, including Europe, Anglo-America, the Soviet Union, the Far East, and Latin America. Emphasis upon the causal factors of differentiation and the role geographic differences play in the interpretation of the current world scene. This course is designed especially for teachers.

### GEOG. 105. GEOGRAPHY OF MARYLAND AND ADJACENT AREAS. (3)

An analysis of the physical environment, natural resources, and population in relation to agriculture, industry, transport, and trade in the state of Maryland and adjacent areas.

### GEOG. 110. ECONOMIC AND CULTURAL GEOGRAPHY OF CARIBBEAN AMERICA. (3)

An analysis of the physical framework, broad economic and historical trends, cultural patterns, and regional diversification of Mexico, Central America, the West Indies, and parts of Colombia and Venezuela. (Chaves.)

**GEOG. 111. ECONOMIC AND CULTURAL GEOGRAPHY OF SOUTH AMERICA. (3)**

A survey of natural environment and resources, economic development and cultural diversity of the South American republics, with emphasis upon problems and prospects of the countries. (Chaves.)

**GEOG. 120. GEOGRAPHY OF EUROPE. (3)**

First and second semesters. Agricultural and industrial development of Europe and present-day problems in relation to the physical and cultural setting of the continent and its natural resources. (Van Royen, Ahnert.)

**GEOG. 122. ECONOMIC RESOURCES AND DEVELOPMENT OF AFRICA. (3)**

The natural resources of Africa in relation to agricultural and mineral production; the various stages of economic development and the potentialities of the future. (Deshler.)

**GEOG. 125. GEOGRAPHY OF ASIA. (3)**

Lands, climates, natural resources and major economic activities in Asia (except Soviet Asia). Outstanding differences between major regions. (Hu.)

**GEOG. 130. ECONOMIC AND POLITICAL GEOGRAPHY OF EASTERN ASIA. (3)**

Study of China, Korea, Japan, the Philippines; physical geographic setting; population; economic and political geography. Potentialities of major regions and recent developments. (Hu.)

**GEOG. 131. ECONOMIC AND POLITICAL GEOGRAPHY OF SOUTH AND SOUTHEAST ASIA. (3)**

Study of the Indian subcontinent, Farther India, Indonesia: physical geographic setting; population; economic and political geography. Potentialities of various countries and regions and their role in present Asia. (Hu.)

**GEOG. 134. CULTURAL GEOGRAPHY OF CHINA AND JAPAN. (3)**

Survey of geographical distribution and interpretation of cultural patterns of China and Japan. Emphasis on basic cultural institutions, outlook on life, unique characteristics of various groups. Trends of cultural change and contemporary problems. (Hu.)

**GEOG. 140. GEOGRAPHY OF THE SOVIET UNION. (3)**

The natural environment and its regional diversity. Geographic factors in the expansion of the Russian state. The geography of agricultural and industrial production, in relation to available resources, transportation problems, and diversity of population. (Anderson.)

**GEOG. 146. REGIONAL GEOMORPHOLOGY. (3)**

Regional and comparative morphology, with special emphasis upon Anglo-America. (Ahnert.)

## GEOGRAPHY

### GEOG. 150. HISTORY AND THEORY OF CARTOGRAPHY. (3)

The development of maps throughout history. Geographical orientation, coordinates, and map scales. Map projections, their nature, use and limitations. Principles of representation of features on physical and cultural maps. Modern uses of maps and relationships between characteristics of maps and use types.

### GEOG. 151, 152. CARTOGRAPHY AND GRAPHICS PRACTICUM. (3, 3)

First and second semesters. One hour lecture and two two-hour laboratory periods a week. Techniques and problems of compilation, design, and construction of various types of maps and graphs. Relationships between map making and modern methods of production and reproduction. Trips to representative plants. Laboratory work directed toward cartographic problems encountered in the making of nontopographic maps. (Wiedel.)

### GEOG. 153. PROBLEMS OF CARTOGRAPHIC REPRESENTATION AND PROCEDURE. (3)

Two hours lecture and two hours laboratory a week. Study of cartographic compilation methods. Principles and problems of symbolization, classification, and representation of map data. Problems of representation of features at different scales and for different purposes. Place-name selection and lettering; stick-up and map composition.

### GEOG. 154. PROBLEMS OF MAP EVALUATION. (3)

Two hours lecture and two hours laboratory a week. Schools of topographic concepts and practices. Theoretical and practical means of determining map reliability, map utility, and source materials. Nature, status, and problems of topographic mapping in different parts of the world. Non-topographic special use maps. Criteria of usefulness for purposes concerned and of reliability. (Wiedel.)

### GEOG. 155. PROBLEMS AND PRACTICES OF PHOTO INTERPRETATION. (3)

Two hours of lecture and two hours of laboratory per week. Interpretation of aerial photographs with emphasis on the recognition of landforms of different types and man-made features. Study of vegetation, soil, and other data that may be derived from aerial photographs. Types of aerial photographs and limitations of photo interpretation. (Ahnert.)

### GEOG. 160. ADVANCED ECONOMIC GEOGRAPHY I. AGRICULTURAL RESOURCES. (3)

First semester, alternate years. Prerequisite, Geog. 10 or Geog. 15. The nature of agricultural resources, the major types of agricultural exploitation in the world, and the geographic distribution of certain major crops and animals in relation to physical environment and economic geographic conditions. Main problems of conservation. (Van Royen.)

### GEOG. 161. ADVANCED ECONOMIC GEOGRAPHY II. MINERAL RESOURCES. (3)

First semester, alternate years. Prerequisite, Geog. 10 or Geog. 15. The nature and geographic distribution of the principal power, metallic and other minerals. Economic geographic aspects of modes of exploitation. Consequences of geographic distribution and problems of conservation. (Van Royen.)

### GEOG. 170. LOCAL FIELD COURSE. (3)

First semester. Training in geographic field methods and techniques. Field ob-

servation of land use in selected rural and urban areas in eastern Maryland. One lecture per week with Saturday and occasional weekend field trips. Primarily for undergraduates. (Ahnert.)

**GEOG. 180. SCIENTIFIC METHODOLOGY AND HISTORY OF GEOGRAPHY. (3)**  
First semester. For undergraduate and graduate majors in Geography. May be taken also by students with a minimum of nine hours in systematic and six hours in regional geography. A comprehensive and systematic study of the history, nature, and basic principles of geography, with special reference to the major schools of geographic thought; a critical evaluation of some of the important geographical works and methods of geographic research. (Hu.)

**GEOG. 190. POLITICAL GEOGRAPHY. (3)**  
Geographical factors in national power and international relations; an analysis of the role of "geopolitics" and "geostrategy," with special reference to the current world scene. (Chaves.)

**GEOG. 195. GEOGRAPHY OF TRANSPORTATION. (3)**  
The distribution of transport routes on the earth's surface; patterns of transport routes; the adjustment of transport routes and media to conditions of the natural environment centers and their distribution.

**GEOG. 197. URBAN GEOGRAPHY. (3)**  
Origins of cities, followed by a study of elements of site and location with reference to cities. The patterns and functions of some major world cities will be analyzed. Theories of land use differentiation within cities will be appraised. (Mika.)

**GEOG. 198. TOPICAL INVESTIGATIONS. (1-3)**  
First and second semesters. Independent study under individual guidance. Restricted to advanced undergraduate students with credit for at least 24 hours in geography, and to graduate students. Any exception should have the approval of the Head of the Department. (Staff.)

**GEOG. 199. UNDERGRADUATE THESIS RESEARCH. (3)**  
Directed regional or systematic study involving several subfields of geography, including cartographic presentation, and usually requiring field work; and leading to an undergraduate thesis. (Limited to undergraduate majors in geography). (Hu.)

## *For Graduates*

**GEOG. 200. FIELD COURSE. (3)**  
Field work in September, conferences and reports during first semester. Practical experience in conducting geographic field studies. Intensive training in field methods and techniques and in the preparation of reports. For graduate students in geography. Open to other students by special permission of the Head of the Department of Geography. (Staff.)

**GEOG. 210, 211. SEMINAR IN THE GEOGRAPHY OF LATIN AMERICA. (3, 3)**

First and second semesters. Prerequisite, Geog. 110, 111 or consent of instructor. An analysis of recent changes and trends in industrial development, exploitation of mineral resources, and land utilization. (Chaves.)

## GEOGRAPHY

### GEOG. 220, 221. SEMINAR IN THE GEOGRAPHY OF EUROPE AND AFRICA. (3, 3)

First and second semesters. Prerequisite, Geog. 120 or 122, or consent of instructor. Analysis of special problems concerning the resources and development of Europe and Africa. (Van Royen, Deshler.)

### GEOG. 230, 231. SEMINAR IN THE GEOGRAPHY OF EAST ASIA. (3, 3)

First and second semesters. Analysis of problems concerning the geography of East Asia with emphasis on special research methods and techniques applicable to the problems of this area. (Hu.)

### GEOG. 240, 241. SEMINAR IN THE GEOGRAPHY OF THE U.S.S.R. (3, 3)

First and second semesters. Investigation of special aspects of Soviet geography. Emphasis on the use of Soviet materials. Prerequisite, reading knowledge of Russian and Geog. 140, or consent of instructor. (Anderson.)

### GEOG. 246. SEMINAR IN THE GEOGRAPHY OF THE NEAR EAST. (3)

First and second semesters.

### GEOG. 250. SEMINAR IN CARTOGRAPHY. (Credit arranged)

First or second semester. The historical and mathematical background of cartographic concepts, practices, and problems, and the various philosophical and practical approaches to cartography. Discussions will be supplemented by the presentation of specific cartographic problems investigated by the students.

### GEOG. 260. ADVANCED GENERAL CLIMATOLOGY. (3)

First semester. Prerequisite, Geog. 41, or consent of instructor. Advanced study of elements and controls of the earth's climates. Principles of climatic classification. Special analysis of certain climatic types.

### GEOG. 261. APPLIED CLIMATOLOGY. (3)

Second semester. Prerequisite, Geog. 41, or consent of instructor. Study of principles, techniques, and data of micro-climatology, physical and regional climatology relating to such problems and fields as transportation, agriculture, industry, urban planning, human comfort and regional geographic analysis.

### GEOG. 262, 263. SEMINAR IN METEOROLOGY AND CLIMATOLOGY. (3, 3)

First and second semesters. Prerequisite, consent of instructor. Selected topics in meteorology and climatology chosen to fit the individual needs of advanced students

### GEOG. 280. GEOMORPHOLOGY. (3)

Second semester. An advanced comparative study of selected geomorphic processes and land forms, theories of land forms evolution and geomorphological problems. (Van Royen.)

### GEOG. 290, 291. SELECTED TOPICS IN GEOGRAPHY. (1-3)

First and second semesters. Readings and discussion on selected topics in the field of geography. To be taken only with joint consent of adviser and Head of the Department of Geography. (Staff.)

### GEOG. 399. DISSERTATION RESEARCH. (Credit to be arranged)

First and second semesters and summer.

(Staff.)

## IV. GOVERNMENT AND POLITICS

The Department of Government and Politics offers programs designed to prepare students for government service, politics, foreign assignments, and intelligent and purposeful citizenship.

Business and Public Administration students may major in Government and Politics. At the Junior/Senior level they may pursue the general G. & P. curriculum or they may pursue a more specialized curriculum either in International Affairs or in Public Administration.

Government and Politics majors must take a minimum of 36 semester hours in G. & P. courses and may not count more than 42 hours in G. & P. toward graduation. No course in which the grade is less than "C" may be counted as part of the major work.

The Government and Politics fields are as follows: (1) American Government and Politics; (2) Comparative Government; (3) International Affairs; (4) Political Theory; (5) Public Administration; (6) Public Law; and (7) Public Policy and Political Behavior.

All G. & P. majors are required to take G. & P. 1, 3, 20, and 141 or 142 (Political Theory). They must take one G. & P. course from three separate G. & P. fields as designated by the Department; and in addition: (a) G. & P. majors (general) must take at least 15 G. & P. semester hours at the 100 level; (b) G. & P. majors taking the International Affairs curriculum must complete at least 15 semester hours at the 100 level in International Affairs and Comparative Government courses, including G. & P. 101; (c) G. & P. majors taking the Public Administration curriculum must complete at least 15 semester hours at the 100 level in Public Administration, including G. & P. 110.

All students majoring in G. & P. (general) or G. & P. with specialization in Public Administration must take a minimum of 12 semester hours in one foreign language. Students majoring in G. & P. with specialization in International Affairs must take a minimum of 12 semester hours in one foreign language *above the first year elementary course*. (The first year elementary requirement may be waived by high school credit or placement tests).

All students majoring in G. & P. must fulfill the requirements of a minor, which involves the completion of 18 semester hours from approved Departments other than G. & P. At least six of the 18 hours must be taken at the 100 level from a single Department. Students majoring in G. & P. with specialization in International Affairs may choose to take all minor courses either in geographical area studies or on a Departmental basis; geographical area minors may be chosen, with the consent of the departmental adviser, from the following: Africa, East Asia, Europe, Latin America, the Middle East, and the Soviet Union. G. & P. general majors and G. & P. majors specializing in Public Administration may not minor in geographical area studies.

## GOVERNMENT AND POLITICS

### FRESHMAN AND SOPHOMORE REQUIREMENTS<sup>3</sup>

<i>Courses</i>	<i>Hours</i>
Econ. 31, 32	6
English 1, 3, 4	9
Fine Arts or Philosophy	3
Foreign Language (International Affairs students must have 12 foreign language credits above the first year elementary level.)	12
G. & P. 1, 3, 20	9
History	6
Math. 10, 11	6
Science (One Physical Science and one Biological Science)	7
Social Science (to fulfill Gen. Educ. Program requirement)	3
Speech 1	3
	<hr/>
	64

### JUNIOR AND SENIOR REQUIREMENTS FOR THE G. & P. GENERAL CURRICULUM

<i>Courses</i>	<i>Hours</i>
G. & P. 141 or 142 (Political Theory)	3
One course from each of three G. & P. fields as designated by the Department	9
Additional 100-level G. & P. courses (May not all be taken in International Affairs/Comparative Government, or all in Public Administration)	15
Requirements for minor	18
Statistics	3
Electives recommended by adviser	12
	<hr/>
	60

<sup>3</sup> See catalog of College of Arts and Sciences for requirements for G. & P. majors in A. & S.

All students must meet University requirements in Physical Education and Health Education.

## GOVERNMENT AND POLITICS

### JUNIOR AND SENIOR REQUIREMENTS FOR THE G. & P. INTERNATIONAL AFFAIRS CURRICULUM

<i>Courses</i>	<i>Hours</i>
G. & P. 141 or 142 (Political Theory)	3
One course from each of three G. & P. fields as designated by the Department	9
Additional 100-level International Affairs and Comparative Government courses including G. & P. 101	15
Requirements for minor (Departmental or Geographical Area Studies)	18
Statistics	3
Electives recommended by adviser	12
	<hr/> 60

### JUNIOR AND SENIOR REQUIREMENTS FOR THE G. & P. PUBLIC ADMINISTRATION CURRICULUM

<i>Courses</i>	<i>Hours</i>
G. & P. 141 or 142 (Political Theory)	3
One course from each of three G. & P. fields as designated by the Department	9
Additional 100-level Public Administration courses including G. & P. 110	15
Requirements for minor	18
Statistics	3
Electives recommended by adviser	12
	<hr/> 60

## GOVERNMENT AND POLITICS

*Professors:* PLISCHKE, ANDERSON, BURDETTE, DILLON, AND HARRISON.

*Associate Professors:* BYRD, HATHORN, HSUEH, JACOBS, AND MCNELLY.

*Assistant Professors:* ALPERIN, CLAUDE, CONWAY, COX, KOURY, O'DONNELL, ONYEWU, PIPER, TERCHEK, AND WOLFE.

*Lecturers:* BARBER, FREDERICKSON, LARSON, RATCHFORD, SOLES, AND ZIMRING.

### G. & P. 1. AMERICAN GOVERNMENT. (3)

This course is designed as the basic course in government and it or its equivalent is a prerequisite to other courses in the Department. It is a comprehensive study of government in the United States—national, state, and local.

### G. & P. 3. PRINCIPLES OF GOVERNMENT AND POLITICS. (3)

A study of the basic principles and concepts of political science.

## GOVERNMENT AND POLITICS

### G. & P. 20. INTRODUCTION TO POLITICAL BEHAVIOR. (3)

Prerequisite, G. & P. 1. Development, concepts, and techniques of the behavioral approach to political science. Comparison with traditional approaches.

### G. & P. 40. POLITICAL IDEOLOGIES. (3)

Prerequisite, G. & P. 1. A survey and analysis of the leading ideologies of the modern world, including anarchism, communism, socialism, fascism, nationalism, and democracy.

### G. & P. 60. STATE AND LOCAL GOVERNMENT. (3)

Prerequisite, G. & P. 1. A study of the functioning and problems of state and local government in the United States, with illustrations from Maryland jurisdictions.

### G. & P. 97. GOVERNMENTS AND POLITICS OF EUROPE. (3)

Prerequisite, G. & P. 1. A comparative study of the political systems of the United Kingdom, France, Germany, Italy, and other selected European countries.

### *For Graduates and Advanced Undergraduates*

### G. & P. 101. INTERNATIONAL POLITICAL RELATIONS. (3)

Prerequisite, G. & P. 1. A study of the major factors underlying international relations, the methods of conducting foreign relations, the foreign policies of the major powers, and the means of avoiding or alleviating international conflicts.

### G. & P. 102. INTERNATIONAL LAW. (3)

Prerequisite, G. & P. 1. A study of the basic character, general principles, and specific rules of international law, with emphasis on recent and contemporary trends in the field and its relation to other aspects of international affairs.

### G. & P. 103. CONTEMPORARY AFRICAN POLITICS. (3)

Prerequisite, G. & P. 1. A survey of contemporary developments in the international politics of Africa, with special emphasis on the role of an emerging Africa in world affairs.

### G. & P. 104. INTER-AMERICAN RELATIONS. (3)

Prerequisite, G. & P. 1. An analytical and historical study of the Latin-American policies of the United States and of problems in our relations with individual countries, with emphasis on recent developments.

### G. & P. 105. RECENT FAR EASTERN POLITICS. (3)

Prerequisite, G. & P. 1. The background and interpretation of recent political events in the Far East and their influence on world politics.

### G. & P. 106. AMERICAN FOREIGN RELATIONS. (3)

Prerequisite, G. & P. 1. The principles and machinery of the conduct of American foreign relations, with emphasis on the Department of State and the Foreign Service, and an analysis of the major foreign policies of the United States.

### G. & P. 107. CONTEMPORARY MIDDLE EASTERN POLITICS. (3)

Prerequisite, G. & P. 1. A survey of contemporary developments in the international politics of the Middle East, with special emphasis on the role of emerging Middle East nations in world affairs.

- G. & P. 108. INTERNATIONAL ORGANIZATION. (3)  
Prerequisite, G. & P. 1. A study of the objectives, structure, functions, and procedures of international organizations, including the United Nations and such functional and regional organizations as the Organization of American States.
- G. & P. 109. FOREIGN POLICY OF THE U.S.S.R. (3)  
Prerequisite, G. & P. 1. A study of the development of the foreign policy of the Soviet Union, with attention paid to the forces and conditions that make for continuities and changes from Tsarist policies.
- G. & P. 110. PRINCIPLES OF PUBLIC ADMINISTRATION. (3)  
Prerequisite, G. & P. 1. A study of public administration in the United States, giving special attention to the principles of organization and management and to fiscal, personnel, planning, and public relations practices.
- G. & P. 111. PUBLIC PERSONNEL ADMINISTRATION. (3)  
Prerequisite, G. & P. 110 or B. A. 160. A survey of public personnel administration, including the development of merit civil service, the personnel agency, classification, recruitment, examination techniques, promotion, service ratings, training, discipline, employee relations, and retirement.
- G. & P. 112. PUBLIC FINANCIAL ADMINISTRATION. (3)  
Prerequisite, G. & P. 110 or Econ. 142. A survey of governmental financial procedures, including processes of current and capital budgeting, the administration of public borrowing, the techniques of public purchasing, and the machinery of control through pre-audit and post-audit.
- G. & P. 113. GOVERNMENTAL ORGANIZATION AND MANAGEMENT. (3)  
Prerequisite, G. & P. 110. A study of the theories of organization and management in American government with emphasis on new trends, experiments, and reorganizations.
- G. & P. 120. PROBLEMS IN POLITICAL BEHAVIOR. (3)  
Prerequisite, G. & P. 1. The problem approach to political behavior with emphasis on theoretical and empirical studies on selected aspects of the political process.
- G. & P. 124. LEGISLATURES AND LEGISLATION. (3)  
Prerequisite, G. & P. 1. A comprehensive study of legislative organization, procedure, and problems. The course includes opportunities for student contact with Congress and with the Legislature of Maryland.
- G. & P. 131. INTRODUCTION TO CONSTITUTIONAL LAW. (3)  
Prerequisite, G. & P. 1. A systematic inquiry into the general principles of the American constitutional system, with special reference to the role of the judiciary in the interpretation and enforcement of the federal constitution.
- G. & P. 132. CIVIL RIGHTS AND THE CONSTITUTION. (3)  
Prerequisite, G. & P. 131. A study of civil rights in the American constitutional context, emphasizing freedom of religion, freedom of expression, minority discrimination, and the rights of defendants.
- G. & P. 133. THE JUDICIAL PROCESS. (3)  
Prerequisite, G. & P. 1. An examination of judicial organization in the United States at all levels of government, with some emphasis on legal reasoning, legal research, and court procedures.

## GOVERNMENT AND POLITICS

### G. & P. 141. HISTORY OF POLITICAL THEORY. (3)

Prerequisite, G. & P. 1. A survey of the principal political theories set forth in the works of writers from Plato to Bentham.

### G. & P. 142. RECENT POLITICAL THEORY. (3)

Prerequisite, G. & P. 1. A study of 19th and 20th century political thought, with special emphasis on recent theories of socialism, communism, and fascism.

### G. & P. 144. AMERICAN POLITICAL THEORY. (3)

Prerequisite, G. & P. 1. A study of the development and growth of American political concepts from the colonial period to the present.

### G. & P. 145. RUSSIAN POLITICAL THOUGHT. (3)

Prerequisite, G. & P. 1. A survey and analysis of political ideas in Russia and the Soviet Union from early times to the present.

### G. & P. 154. PROBLEMS OF WORLD POLITICS. (3)

Prerequisite, G. & P. 1. A study of governmental problems of international scope, such as causes of war, problems of neutrality, and propaganda. Students are required to report on readings from current literature.

### G. & P. 160. STATE AND LOCAL ADMINISTRATION. (3)

Prerequisite, G. & P. 1. A study of the administrative structure, procedures, and policies of state and local governments with special emphasis on the state level and on intergovernmental relationships, and with illustrations from Maryland governmental arrangements.

### G. & P. 161. METROPOLITAN ADMINISTRATION. (3)

Prerequisite, G. & P. 1. An examination of administrative problems relating to public services, planning, and coordination in a metropolitan environment.

### G. & P. 171. PROBLEMS OF AMERICAN PUBLIC POLICY. (3)

Prerequisite, G. & P. 1. The background and interpretation of various factors which affect the formation and execution of American public policy.

### G. & P. 174. POLITICAL PARTIES. (3)

Prerequisite, G. & P. 1. A descriptive and analytical examination of American political parties, nominations, elections, and political leadership.

### G. & P. 178. PUBLIC OPINION. (3)

Prerequisite, G. & P. 1. An examination of public opinion and its effect on political action, with emphasis on opinion formation and measurement, propaganda, and pressure groups.

### G. & P. 181. ADMINISTRATIVE LAW. (3)

Prerequisite, G. & P. 1. A study of the discretion exercised by administrative agencies, including analysis of their functions, their powers over persons and property, their procedures, and judicial sanctions and controls.

### G. & P. 191. GOVERNMENT AND ADMINISTRATION OF THE SOVIET UNION. (3)

Prerequisite, G. & P. 1. A study of the adoption of the communist philosophy by the Soviet Union, of its governmental structure, and of the administration of government policy in the Soviet Union.

- G. & P. 192. **GOVERNMENT AND POLITICS OF LATIN AMERICA.** (3)  
Prerequisite, G. & P. 1. A comparative study of the governmental systems and political processes of the Latin American countries, with special emphasis on Argentina, Brazil, Chile, and Mexico.
- G. & P. 193. **GOVERNMENT AND POLITICS OF ASIA.** (3)  
Prerequisite, G. & P. 97, or G. & P. 105, or Hist. 61, or Hist. 62, or Hist. 187, or Hist. 188, or Hist. 189. A comparative study of the political systems of China, Japan, India, and other selected Asian countries.
- G. & P. 194. **GOVERNMENT AND POLITICS OF AFRICA.** (3)  
Prerequisite, G. & P. 1. A comparative study of the governmental systems and political processes of the African countries, with special emphasis on the problems of nation-building in emergent countries.
- G. & P. 195. **GOVERNMENT AND POLITICS OF THE MIDDLE EAST.** (3)  
Prerequisite, G. & P. 1. A comparative study of the governmental systems and political processes of the Middle Eastern countries, with special emphasis on the problems of nation-building in emergent countries.
- G. & P. 197. **COMPARATIVE POLITICAL SYSTEMS.** (3)  
Prerequisite, G. & P. 97 and at least one other course in comparative government. A study, along functional lines, of major political institutions, such as legislatures, executives, courts, bureaucracies, public organizations, and political parties.

*For Graduates*

- G. & P. 201. **SEMINAR IN INTERNATIONAL POLITICAL ORGANIZATION.** (3)  
A study of the forms and functions of various international organizations.
- G. & P. 202. **SEMINAR IN INTERNATIONAL LAW.** (3)  
Reports on selected topics assigned for individual study and reading in substantive and procedural international law.
- G. & P. 203. **FUNCTIONAL PROBLEMS IN INTERNATIONAL RELATIONS.** (3)  
An examination of the major substantive issues in contemporary international relations, involving reports on selected topics based on individual research.
- G. & P. 204. **AREA PROBLEMS IN INTERNATIONAL RELATIONS.** (3)  
An examination of problems in the relations of states within a particular geographic area, such as Europe, Asia and the Far East, Africa and the Middle East, and the Western Hemisphere. Individual reporting as assigned.
- G. & P. 205. **SEMINAR IN AMERICAN POLITICAL INSTITUTIONS.** (3)  
Reports on topics assigned for individual study and reading in the background and development of American government.
- G. & P. 206. **SEMINAR IN AMERICAN FOREIGN RELATIONS.** (3)  
Reports on selected topics assigned for individual study and reading in American foreign policy and the conduct of American foreign relations.
- G. & P. 207. **SEMINAR IN COMPARATIVE GOVERNMENTAL INSTITUTIONS.** (3)  
Reports on selected topics assigned for individual study and reading in governmental and political institutions in governments throughout the world.

## GOVERNMENT AND POLITICS

### G. & P. 208. SEMINAR IN THE GOVERNMENT AND POLITICS OF EMERGING NATIONS. (3)

An examination of the programs of political development in the emerging nations, with special reference to the newly independent nations of Asia and Africa and the less developed countries of Latin America. Individual reporting as assigned.

### G. & P. 209. SEMINAR IN INTERNATIONAL ADMINISTRATION. (3)

An analysis of the administrative aspects of international organizations, with some attention given to program administration.

### G. & P. 211. SEMINAR IN FEDERAL-STATE RELATIONS. (3)

Reports on topics assigned for individual study and reading in the field of recent federal-state relations.

### G. & P. 213. PROBLEMS OF PUBLIC ADMINISTRATION. (3)

Reports on topics assigned for individual study and reading in the field of public administration.

### G. & P. 214. PROBLEMS OF PUBLIC PERSONNEL ADMINISTRATION. (3)

Reports on topics assigned for individual study and reading in the field of public personnel administration.

### G. & P. 215. PROBLEMS OF STATE AND LOCAL GOVERNMENT. (3)

Reports on topics assigned for individual study in the field of state and local government throughout the United States.

### G. & P. 216. GOVERNMENT ADMINISTRATIVE PLANNING AND MANAGEMENT. (3)

Reports on topics assigned for individual study and reading in administrative planning and management in government.

### G. & P. 218. SEMINAR IN URBAN ADMINISTRATION. (3)

Selected topics are examined by the team research method with students responsible for planning, field investigation, and report writing.

### G. & P. 221. SEMINAR IN PUBLIC OPINION. (3)

Reports on topics assigned for individual study and reading in the field of public opinion.

### G. & P. 223. SEMINAR IN LEGISLATURES AND LEGISLATION. (3)

Reports on topics assigned for individual study and reading about the composition and organization of legislatures and about the legislative process.

### G. & P. 224. SEMINAR IN POLITICAL PARTIES AND POLITICS. (3)

Reports on topics assigned for individual study and reading in the fields of political organization and action.

### G. & P. 225. MAN AND THE STATE. (3)

Prerequisite, G. & P. 142. Individual reading and reports on such recurring concepts in political theory as liberty, equality, justice, natural law and natural rights, private property, sovereignty, nationalism and the organic state.

### G. & P. 226. SCOPE AND METHOD OF POLITICAL SCIENCE. (3)

Required of all Ph.D. candidates. A seminar in the methodologies of political science, and their respective applications to different research fields. Inter-disciplinary approaches and bibliographical techniques are also reviewed.

- G. & P. 227. **ANALYTICAL SYSTEMS AND THEORY CONSTRUCTION.** (3)  
Prerequisite, G. & P. 226. Examination of the general theoretical tools available to political scientists and of the problems of theory building. Attention is given to communications theory, decision-making, game theory and other mathematical concepts, personality theory, role theory, structural-functional analysis, and current behavioral approaches.
- G. & P. 231. **SEMINAR IN PUBLIC LAW.** (3)  
Reports on topics assigned for individual study and reading in the fields of constitutional and administrative law.
- G. & P. 261. **PROBLEMS IN AMERICAN GOVERNMENT AND POLITICS.** (3)  
An examination of contemporary problems in various fields of government and politics in the United States, with reports on topics assigned for individual study.
- G. & P. 399. **THESIS RESEARCH.** (Arranged)

## INFORMATION SYSTEMS MANAGEMENT

The program of studies in information systems management is designed to meet the needs of those wishing to concentrate on the application of the digital computer to the analysis and design of complex information systems. Students who expect to enter business administration, public administration, or organizations in other fields will find that this program offers a relevant preparation.

In addition to meeting the University requirements, the student entering this program will place major emphasis on the study of the digital computer and mathematical methods. With the aid of a faculty adviser, he may select 15 hours of electives from the fields of business, economics, public administration, or any appropriate social science. Certain advanced lower division courses in mathematics, natural science or foreign language may be used to meet the 57 semester-hour requirement in upper division courses.

## INFORMATION SYSTEMS MANAGEMENT CURRICULUM

	—Semester—	
	I	II
FRESHMAN YEAR		
Eng. 1—Composition and American Literature.....	3	..
Eng. 3—Composition and World Literature.....	..	3
B. A. 10—Introduction to Business.....	3	..
Math. 10, 11—Introduction to Mathematics.....	3	3
Econ. 4—Economic Developments .....	..	3
Science Requirement .....	3(4)	4(3)
Speech 1—Public Speaking .....	3	..
Fine Arts and Philosophy Requirement.....	..	3
P. E. 2, 4 (women); 1, 3 (men).....	1	1
Total.....	16-17	16-17

## OFFICE TECHNIQUES

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature.....	3	..
B. A. 20, 21—Principles of Accounting.....	3	3
Econ. 31, 32—Principles of Economics.....	3	3
Math. 14, 15—Elementary Calculus.....	3	3
History Requirement.....	3	3
Psych. 1—Introduction to Psychology.....	..	3
Health 5 (Must be completed before 4th semester).....	2	..
Total.....	17	15
<b>JUNIOR YEAR</b>		
B. A. 100—Office Operations and Management.....	..	3
B. A. 101—Electronic Data Processing.....	3	..
B. A. 102—Electronic Data Processing Applications.....	..	3
B. A. 121—Cost Accounting.....	..	4
B. A. 130—Business Statistics I.....	3	..
B. A. 131—Business Statistics II.....	..	3
B. A. 140—Business Finance.....	3	..
Electives.....	6	3
Total.....	15	16
<b>SENIOR YEAR</b>		
B. A. 103—Introduction to Systems Analysis.....	3	..
B. A. 166—Business Communications.....	..	3
B. A. 168—Management and Organization Theory.....	3	..
B. A. 180—Business Law.....	..	3
B. A. 199—Business Policies.....	..	3
Elect 6 hours from Econ. 102, 132, 140 or 148.....	3	3
Elect 3 hours from B. A. 132, 134, or 135.....	3	..
Electives.....	3	3
Total.....	15	15

## OFFICE TECHNIQUES

### (COURSES OFFERED FOR COLLEGE OF EDUCATION)

*Professor:* PATRICK.

*Instructors:* ANDERSON, GUNTER, O'NEILL.

#### O. T. 1. PRINCIPLES OF TYPEWRITING. (2)

Five periods per week. Prerequisite, consent of instructor. Laboratory fee, \$7.50. The goal of this course is the attainment of the ability to operate the typewriter continuously with reasonable speed and accuracy by the use of the "touch" system.

#### O. T. 2. INTERMEDIATE TYPEWRITING. (2)

Five periods per week. Prerequisite, minimum grade of "C" in O. T. 1 or consent of instructor. Laboratory fee, \$7.50. Drills for improving speed and accuracy and an introduction to office production typewriting. This course must be completed prior to enrollment in O. T. 17.

- O. T. 10. OFFICE TYPEWRITING PROBLEMS. (2)  
Five periods per week. Prerequisite, minimum grade of "C" in O. T. 2 or consent of instructor. Laboratory fee, \$7.50 A course to develop the higher degree of accuracy and speed possible and to teach the advanced techniques of typewriting with special emphasis on production.
- O. T. 12, 13. PRINCIPLES OF SHORTHAND. (3, 3)  
Prerequisite, consent of instructor. Five periods per week. This course aims to develop the mastery of the principles of Gregg Shorthand. In O. T. 13 special emphasis is placed on developing dictation speed.
- O. T. 14. SURVEY OF OFFICE MACHINES (2)  
Prerequisite, sophomore standing. Laboratory fee, \$7.50. The various types of office business machines are surveyed, their capacities and special functions compared. Skill is developed through actual use and demonstration of such machines as: accounting, duplicating, dictating and transcribing, adding and calculating, and other functional types of machines and equipment. The course is designed also to give special training in the handling of practical business problems with machine application.
- O. T. 17. ADVANCED SHORTHAND AND TRANSCRIPTION. (3)  
Prerequisite, minimum grade of "C" in O. T. 2 and O. T. 13 or consent of instructor. Seven periods per week. Laboratory fee, per semester, \$7.50. Emphasis is placed on vocabulary development and new matter dictation for sustained speed at the highest level possible under varying conditions. Transcription is under timed conditions with emphasis on production involving quantity and quality of finished product.
- O. T. 19. PROBLEMS IN TRANSCRIPTION. (3)  
Prerequisite, minimum grade of "C" in O. T. 17 or consent of instructor. Seven periods per week. Laboratory fee, per semester, \$7.50. A systematic development of recording skills under special and office-style dictation and transcription conditions with particular emphasis on transcriptional problems.
- O. T. 110. ADMINISTRATIVE SECRETARIAL PROCEDURES. (3)  
Prerequisite, O. T. 18 and 19 or consent of the instructor. The nature of office work, the secretary's function in communication, inter-company and public relations, handling records, supplies and equipment; and in direction of the office staff. Standardization and simplification of office forms and procedures in relation to correspondence, mailing, receiving callers, telephoning, handling conferences, and securing business information. Business etiquette and ethics.
- O. T. 114. SECRETARIAL OFFICE PRACTICE. (3)  
Six periods per week. Prerequisite, senior standing and completion of O. T. 110. The purpose of this course is to give laboratory and office experience to senior students. A minimum of 90 hours of office experience under supervision is required. In addition, each student will prepare a written report on an original problem previously approved.

## V. JOURNALISM

The first objective of the Department of Journalism is to provide a four-year liberal education for the student of superior writing ability who intends to make a career in some phase of journalism. It also serves the major within the department whose career intention may be in a field related to journalism.

The department's curriculum in news editorial journalism has been accredited by the American Council on Education for Journalism. The department is a member of the American Association of Schools and Departments of Journalism and of the American Society of Journalism School Administrators.

Particular features of the curriculum are (1) a two-year introductory program of general education, centered in the liberal arts, (2) a required core program, equivalent to approximately one semester, in basic aspects of journalism, (3) specialization beyond the core in news-editorial work, photojournalism, public relations, radio-television work, or advertising, (4) the equivalent of approximately one semester of upper-division study in a subject chosen from outside the Department of Journalism, (5) elective courses and (6) opportunities for field contacts.

The student may declare his intention to major in the Department of Journalism at the beginning of any semester, but normally before the junior year. His choices of specialization within the department and of related study in other departments should be made by the beginning of the junior year and after consultation with a faculty adviser.

An average grade of "C" or better in courses taken in the department is required of journalism majors for graduation.

Majors are urged and helped to write for publication and to obtain professional experience between the junior and senior years on the job or in summer internships. The department maintains close working relations with professional journalists, public relations practitioners and their organizations. One of the purposes is to provide speakers, trips, laboratories, internships and other types of supervised professional training for students.

An essential part of the work in editorial journalism consists of supervised training on the Baltimore Sunpapers or the Baltimore News-American and nearby weekly papers. The experience may also be obtained on other publications, approved by the adviser. This professional training helps students to become familiar with reporting, editing and advertising for professional publications covering Maryland and Capitol Hill in Washington, D. C.

Listed below are the lower-division and the upper-division requirements for majors in the department of journalism. In qualifying for the degree,

the student must complete 120 semester hours; 57 hours of which must be upper-division credit. The exceptions to the upper-division rule are noted on page 3 of this catalog.

Course substitutions may be made by the faculty adviser to take account of previous professional experience and to develop programs to include special study. Within the broad outlines of the upper-division courses themselves, students are encouraged to develop individual interests by careful choice of elective courses.

## LOWER-DIVISION CURRICULUM

	Semester	
	I	II
<i>Freshman Year</i>		
English 1 (or 21), 3—Composition and American Literature	3	3
Science (one course of which must be a lab science) . . . . .	4	3
Foreign language (or B. A. 10, Econ. 4) . . . . .	3	3
Psychology 1 . . . . .	3	..
Soc. 1—Introduction to Sociology . . . . .	..	3
Speech 1—Public Speaking . . . . .	3	..
Math. 10—Introduction to Mathematics . . . . .	..	3
Health 5—Science and Theory of Health . . . . .	..	2
Physical Activities . . . . .	1	1
<b>Total</b> . . . . .	<b>17</b>	<b>18</b>
<i>Sophomore Year</i>		
Journ. 10—Introduction to Journalism . . . . .	3	..
English 4—Composition and World Literature, and one other English course . . . . .	3	3
Foreign language (or Psych. 21, Soc. 52) . . . . .	3	3
History <sup>4</sup> . . . . .	3	3
Econ. 31, 32—Principles of Economics . . . . .	3	3
Elective from Phil. 1 (or 41 or 45 or 53), Art 10 (or 60, 61, 80), Speech 16, Music 20 . . . . .	..	3
<b>Total</b> . . . . .	<b>15</b>	<b>15</b>

<sup>4</sup> Students who do not exempt American History take one course in American History, and complete history requirement by taking 41. Those who exempt American History may take History 41, 42 or 51, 52 or 61, 62 or 71, 72.

## JOURNALISM

### UPPER-DIVISION CURRICULUM

#### *The core program:*

Journ. 100—News Reporting.....	3
Journ. 160—News Editing.....	3
Journ. 191—Law of the Press.....	3
Journ. 192—History of American Journalism.....	3

#### Professional specialization:

9 credit hours in upper-division courses in one of the following fields:

Advertising .....	9
News-editorial	
Photojournalism	
Public Relations	
Radio-television	
Electives in Department of Journalism.....	6

27

#### Non-Journalism requirements:

12-18 credit hours in upper-division courses in one subject outside of the Journalism Department	12 - 18
15 credit hours of upper-division, non-journalism courses, to be spread or concentrated according to individual needs .....	15

27 - 33

#### TOTAL UPPER-DIVISION

54 - 60

## JOURNALISM

*Professors:* CROWELL, BRYAN, NEWSOM.

*Associate Professor:* VINOCOUR.

*Assistant Professor:* NOALL.

*Lecturers:* GERACI, HOGAN.

### JOURNALISM COURSES

#### JOURN. 10. INTRODUCTION TO JOURNALISM. (3)

Survey of journalism, professional careers in writing and communications, news writing in laboratory. Prerequisites, at least average grade of C in Eng. 1 and 2 or 21; ability to type at least 40 words per minute. Laboratory fee, \$3.00.

**JOURN. 100. NEWS REPORTING. (3)**

News reporting, campus news beat in laboratory. Prerequisite, J. 10. Laboratory fee, \$3.00.

**JOURN. 101. RADIO NEWS REPORTING. (2)**

Theory and practice in radio news reporting. Laboratory fee, \$3.00.

**JOURN. 152. ADVERTISING COPY AND LAYOUT. (3)**

Theory and practice in advertising copy and layout, with emphasis on newspaper advertising, for letterpress and photo-offset printing. Use of illustrations, type selection, copy-fitting, media selection.

**JOURN. 160. NEWS EDITING. (3)**

Copy editing, headline writing, newspaper page layout. Laboratory fee, \$3.00.

**JOURN. 161. ADVANCED EDITING. (3)**

Includes one afternoon a week of supervised work on Baltimore Sun or Baltimore News-American desk, arranged. Prerequisite, J. 160, consent of instructor. Headline writing, rewriting, copy editing, makeup. A seminar for J. seniors in newsroom problems and policies emphasizing ethics and responsibilities.

**JOURN. 163. NEWSPAPER TYPOGRAPHY. (3)**

Introduction to newspaper typography, printing and reproduction processes. type recognition, uses and harmony, practice in laying out and making up advertisements and newspaper pages.

**JOURN. 165. FEATURE WRITING. (3)**

Writing and selling of newspaper and magazine articles.

**JOURN. 166. PUBLIC RELATIONS. (3)**

Survey of public relations, principles, general orientation.

**JOURN. 170. PUBLICITY TECHNIQUES. (3)**

Strategy and techniques of publicity operations. Practice in use of major media of public communication; off-campus publicity projects.

**JOURN. 171. INDUSTRIAL JOURNALISM. (3)**

Industrial communications, management and production of company periodicals, public relations aspects of industrial journalism.

**JOURN. 173. SCHOLASTIC JOURNALISM. (3)**

Introduction to theory and practice in production of high school publications, for scholastic publications advisers.

**JOURN. 175. ADVANCED REPORTING. (3)**

Includes one weekday morning on regular beat for Baltimore Sun, Baltimore News-American or weekly newspaper; supervised, professional reporting on city, county, federal beats. Prerequisite, Journ. 160, consent of instructor.

**JOURN. 176. THE PRESS AND WORLD SOCIETIES. (3)**

Survey of history and status of news press throughout the world, role of the press in various societies, responsibilities of the press.

**JOURN. 181. PRESS PHOTOGRAPHY. (3)**

Introduction to fundamentals of shooting, developing, printing of news and

## JOURNALISM AND PUBLIC RELATIONS

feature pictures. Equipment furnished by the department. Student furnishes own supplies. Laboratory fee, \$6.00.

### JOURN. 182. ADVANCED PRESS PHOTOGRAPHY. (3)

Emphasis on the picture story. Equipment provided by the department. Student furnishes his own supplies.

### JOURN. 184. PHOTO COMMUNICATIONS. (3)

Theory and practice in uses of photojournalism; persuasion in photojournalism.

### JOURN. 186. PUBLIC RELATIONS OF GOVERNMENT. (3)

Study of public relations, publicity, propaganda, information services in public administration of governments and international organizations.

### JOURN. 191. LAW OF THE PRESS. (3)

Non-legal introduction to libel, right of privacy, fair comment and criticism, privilege, contempt of court by publication, Maryland press statutes.

### JOURN. 192. HISTORY OF AMERICAN JOURNALISM. (3)

History of American journalism and its influences on political, social and cultural institutions.

### JOURN. 194. PUBLIC RELATIONS CASES AND RESEARCH. (3)

Study of cases in public relations, policy formulation, strategy, ethics, research projects.

### JOURN. 196. PROBLEMS IN JOURNALISM. (1 or 2)

Group and individual projects in problems in journalism.

### JOURN. 197S. SUPERVISED INTERNSHIP. (0)

Summer session. To be taken following junior year as major in this department, permission of instructor. Ten weeks of organized, supervised study, experience, on-the-job training in journalism.

## VII. BUREAU OF BUSINESS AND ECONOMIC RESEARCH

The responsibilities of the Bureau of Business and Economic Research are research, training, and public service.

The research activities of the Bureau are primarily focused on basic research in the field of regional economic development. The Bureau's long-run research program is carried out by its own staff of faculty members, by faculty members from other departments under co-operative agreement, and by other specialists whose skills may be required in particular investigations. The Bureau also undertakes co-operative research contracts under the sponsorship of federal and state governmental agencies, research foundations, and other groups.

## BUREAU OF GOVERNMENTAL RESEARCH

The training functions of the Bureau are achieved through active participation by advanced graduate and undergraduate students in the Bureau's research program. This direct involvement of students in the research process under faculty supervision provides research skills that equip students for responsible posts in business, government and higher education.

The Bureau observes its service responsibilities to government, business, and private groups primarily through the publication and distribution of its research findings. In addition, the Bureau staff welcomes the opportunity to be of service to governmental, business, and private groups by consulting with them on problems in business and economics, particularly those related to regional development.

## VIII. BUREAU OF GOVERNMENTAL RESEARCH

Activities of the Bureau of Governmental Research relate primarily to the problems of state and local government in Maryland. The Bureau engages in research and publishes findings with reference to local, state and national governments and their interrelationships. It undertakes surveys and offers its assistance and service to units of government in Maryland and serves as a clearing house of information for them. The Bureau furnishes opportunities for qualified students interested in research and career development in state and local administration.

The Maryland Technical Advisory Service, a division of the Bureau, provides consulting services to country and municipal governments of the State. Technical consultation and assistance are provided on specific problems in such areas as regulatory or other drafting and codification, fiscal management, personnel management, utility and other service operations, planning and zoning, and related local or intergovernmental activities. The staff analyzes and shares with governmental officials information concerning professional developments and opportunities for new or improved programs and facilities.

## IX. AFFILIATED GOVERNMENTAL ORGANIZATIONS

### (1.) MARYLAND COUNTY COMMISSIONERS ASSOCIATION

The office of the Maryland County Commissioners Association, an organization of the governing bodies of Maryland counties, is located in the College. The Association develops programs of cooperation, information, and service among the county governments in the State. The

## AFFILIATED GOVERNMENTAL ORGANIZATIONS

Association's mailing address is Maryland County Commissioners Association, Box 362, College Park, Maryland.

### (2.) MARYLAND MUNICIPAL LEAGUE

The office of the Maryland Municipal League, an organization of Maryland cities, is also located in the College of Business and Public Administration. The League provides opportunities for association to municipal officials, offers services to city governments and organizes legislative programs affecting municipal affairs. It publishes monthly the *Maryland Municipal News*. The League's mailing address is Maryland Municipal League, Box 276, College Park, Maryland.

# The Faculty

## *Administrative Officers*

O'CONNELL, Donald W., Dean of the College of Business and Public Administration and Professor of Economics

B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.

GENTRY, Dwight L., Assistant Dean of the College of Business and Public Administration and Professor of Business Administration

A.B., Elon College, 1941; M.B.A., Northwestern University, 1947; Ph.D., University of Illinois, 1952.

## *Dean Emeritus*

PYLE, J. Freeman, Dean Emeritus of the College of Business and Public Administration

Ph.B., University of Chicago, 1917; M.A., 1918; Ph.D., 1925.

## *Professors*

ANDERSON, Thornton H., Professor of Government and Politics

A.B., University of Kentucky, 1937; M.A., 1938; Ph.D., University of Wisconsin, 1948.

BURDETTE, Franklin L., Professor of Government and Politics, and Director of the Bureau of Governmental Research

A.B., Marshall College, 1934; M.A., University of Nebraska, 1935; M.A., Princeton University, 1937; Ph.D., 1938; LL.D., Marshall College, 1959.

BRYAN, Carter R., Professor of Journalism

B.A., University of California, 1937; Ph.D., University of Vienna, Austria, 1940.

CLEMENS, Eli W., Professor of Business Administration

B.S., Virginia Polytechnic Institute, 1930; M.S., University of Illinois, 1934; Ph.D., University of Wisconsin, 1940.

COOK, J. Allan, Professor of Marketing

B.A., College of William and Mary, 1928; M.B.A., Harvard University, 1936; Ph.D., Columbia University, 1947.

CROWELL, Alfred A., Professor and Head of the Department of Journalism

A.B., University of Oklahoma, 1929; M.A., 1934; M.S.J., Northwestern University, 1940.

CUMBERLAND, John H., Professor of Economics and Assistant Director, in Charge, Bureau of Business and Economic Research

B.A., University of Maryland, 1947; M.A., Harvard University, 1949; Ph.D., 1951.

## FACULTY

DILLARD, Dudley, Professor and Head of the Department of Economics  
B.S., University of California, 1935; Ph.D., 1940.

DILLON, Conley H., Professor of Government and Politics  
B.A., Marshall College, 1928; M.A., Duke University, 1933; Ph.D., 1936.

FISHER, Allan J., Professor of Accounting and Finance  
B.S., Wharton School of Finance and Commerce, 1928; Litt.M., University of Pittsburgh, 1936; Ph.D., 1937.

GRUCHY, Allan G., Professor of Economics  
B.A., University of British Columbia, 1926; M.A., McGill University, 1928; Ph.D., University of Virginia, 1931.

HARRISON, Horace V., Professor of Government and Politics  
B.A., Trinity University, Texas, 1932; M.A., University of Texas, 1941; Ph.D., 1951.

HU, Charles Y., Professor of Geography  
B.S., University of Nanking, China, 1930; M.A., University of California, 1936; Ph.D., University of Chicago, 1941.

NELSON, Boyd L., Professor of Statistics  
B.A., University of Wisconsin, 1947; M.A., 1948; Ph.D., 1952.

NEWSOM, D. Earl, Professor of Journalism and Director of the Sequence in Editorial Journalism  
B.S., Oklahoma State University, 1948; M.S.J., Northwestern University, 1949; Ed.D., Oklahoma State University, 1957.

PATRICK, Arthur S., Professor of Office Management and Business Education  
B.S., Wisconsin State College, 1931; M.A., University of Iowa, 1940; Ph.D., American University, 1956.

PLISCHKE, Elmer, Professor and Head of the Department of Government and Politics  
Ph.B., Marquette University, 1937; M.A., American University, 1938; Ph.D., Clark University, 1943.

SCHULTZE, Charles L., Professor of Economics  
B.A., Georgetown University, 1948; M.A., 1950; Ph.D., University of Maryland, 1960.

TAFF, Charles A., Professor and Head of the Department of Business Administration  
B.S., University of Iowa, 1937; M.A., 1941; Ph.D., University of Maryland, 1952.

ULMER, Melville J., Professor of Economics  
B.S., New York University, 1937; M.A., 1938; Ph.D., Columbia University, 1948.

VAN ROYEN, William, Professor of Geography  
M.A., Rijksuniversiteit Utrecht, 1925; Ph.D., Clark University, 1928

WRIGHT, Howard W., Professor of Accounting

B.S., Temple University, 1937; M.A., University of Iowa, 1940; C.P.A., Texas, 1940; Ph.D., University of Iowa, 1947.

### *Associate Professors*

AHNERT, Frank O., Associate Professor of Geography

Dr. Phil., Heidelberg University, 1953.

ANDERSON, Henry, Associate Professor of Statistics

B.A., University of London, 1939; M.B.A., 1948, Ph.D., Columbia University, 1959.

ASHMEN, Roy, Associate Professor of Marketing

B.S., Drexel Institute of Technology, 1935; M.S., Columbia University, 1936; Ph.D., Northwestern University, 1950.

BERGMANN, Barbara R., Associate Professor of Economics

A.B., Cornell University, 1948; M.A., Radcliffe Graduate School (Harvard University), 1955; Ph.D., 1959.

BYRD, Elbert M., Jr., Associate Professor of Government and Politics

B.S., American University, 1953; M.A., 1954; Ph.D., 1959.

CHAVES, Antonio, Associate Professor of Geography

M.A., Northwestern, 1948; D.Litt., University of Habana, 1941; Ph.D., University of Habana, 1946.

DAWSON, Townes L., Associate Professor of Business Law

B.B.A., University of Texas, 1943; B.A., U.S. Merchant Marine Academy, 1946; M.B.A., University of Texas, 1947; Ph.D., 1950; LL.B., 1954.

DESHLER, Walter W., Associate Professor of Geography

B.S., Lafayette College, 1943; M.A., University of Maryland, 1952; Ph.D., 1957.

DODGE, Norton T., Associate Professor of Economics

A.B., Cornell University, 1948; M.A., Harvard University, 1951; Ph.D., 1960.

HATHORN, Guy B., Associate Professor of Government and Politics

B.A., University of Mississippi, 1940; M.A., 1942; Ph.D., Duke University, 1950.

HSUEH, Chun-tu, Associate Professor of Government and Politics

LL.B., Chaoyang College, 1946; M.A., Columbia University, 1953; Ph.D., 1958.

JACOBS, Walter D., Associate Professor of Government and Politics

B.S., Columbia University, 1955; M.A., and Certificate of Russian Institute, 1956; Ph.D., 1961.

KNIGHT, Robert E. L., Associate Professor of Economics

A.B., Harvard University, 1948; Ph.D., University of California, 1958.

## FACULTY

- MCNELLY, Theodore H., Associate Professor of Government and Politics  
B.S., University of Wisconsin, 1941; M.A., 1942; Ph.D., Columbia University, 1952.
- SPIVEY, Clinton, Associate Professor of Industrial Management  
B.S., University of Illinois, 1946; M.S., 1947; Ph.D., 1957.
- VINOCOUR, S. M., Associate Professor of Public Relations  
A.B., University of Southern California, 1943; M.A., University of Nevada, 1948; Ph.D., Pennsylvania State University, 1953.
- WEINSTEIN, Paul A., Associate Professor of Economics  
B.A., William and Mary College, 1954; M.A., Northwestern University, 1958; Ph.D., 1961.
- WONNACOTT, Paul, Associate Professor of Economics  
B.A., University of Western Ontario, 1955; M.A., Princeton, 1957; Ph.D., 1959.

### *Assistant Professors*

- ADAMS, John Quincy III, Assistant Professor of Economics  
A.B., Oberlin College, 1960; Ph.D., University of Texas, 1966.
- ADAMS, Robert F., Assistant Professor of Economics and Research Associate, Bureau of Business and Economic Research  
B.A., Oberlin College, 1958; M.A., University of Michigan, 1960; Ph.D., 1963.
- ALPERIN, Robert J., Assistant Professor of Government and Politics  
B.A., University of Chicago, 1950; M.A., 1952; Ph.D., Northwestern University, 1959.
- ANDERSON, Jeremy H., Assistant Professor of Geography  
B.A., Yale University, 1956; M.A., University of Washington, 1959; Ph.D., 1964.
- BAKER, James C., Assistant Professor of Business Administration  
B.S., 1961; M.B.A., 1962; D.B.A., Indiana University, 1965.
- BARTLETT, Hale C., Assistant Professor of Transportation  
B.S., 1955, Univ. of Illinois; M.B.A., 1959, Ph.D., Univ. of Mich., 1965.
- BENNETT, Robert L., Assistant Professor of Economics  
B.A., University of Texas, 1951; M.A., 1955; Ph.D., 1963.
- BRUNNER, G. Allen, Assistant Professor of Marketing  
B.B.A., University of Toledo, 1958; M.B.A., 1960; Ph.D., The Ohio State University, 1963.
- CANTERBURY, E. Ray, Assistant Professor of Economics  
B.A., Southern Illinois University, 1958; M.A., 1959; Ph.D., Washington University (Mo.), 1966.
- CARROLL, Stephen J., Jr., Assistant Professor of Business Administration  
BS., 1957, Univ. of Calif.; M.A., 1959, Ph.D., 1964, Univ of Minnesota.

## FACULTY

- CLAUDE, Richard P., Assistant Professor of Government and Politics  
B.A., College of St. Thomas, 1956; M.S., Florida State University, 1960; Ph.D., University of Virginia, 1964.
- CLICKNER, Edwin K., Assistant Professor in Business Organization  
B.S., American University, 1951; M.A., 1955; Ph.D., American University, 1963.
- CONWAY, Mary Margaret, Assistant Professor of Government and Politics  
B.S., Purdue University, 1957; M.A., University of California, 1960; Ph.D., Indiana University, 1965.
- COX, James L., Assistant Professor of Government and Politics  
B.A., University of Colorado, 1962; M.P.A., 1965; Ph.D., 1965.
- CULBERTSON, John, Assistant Professor of Business Administration  
B.S., 1959, Univ. of Wisconsin; M.B.A., 1961, Univ. of Md.; D.B.A., 1965, Harvard University.
- DAIKER, John A., Assistant Professor of Accounting  
B.S., University of Maryland, 1941; M.B.A., 1951; C.P.A., District of Columbia, 1949.
- DORSEY, John W., Assistant Professor of Economics  
B.S., University of Maryland, 1958; M.A., Harvard University, 1962; Ph.D., 1964.
- EDELSON, Charles B., Assistant Professor of Accounting  
B.B.A., University of New Mexico, 1949; M.B.A., Indiana University, 1950; C.P.A., Maryland, 1951.
- GORDON, Marvin, Assistant Professor of Geography  
B.A., City University, New York City, 1942; M.A., Columbia University, 1954.
- GREEN, George R., Assistant Professor of Economics  
A.B., Northwest Missouri State College, 1958; Ph.D., University of Pennsylvania, 1966.
- HERMANSON, Roger H., Assistant Professor of Accounting  
B.A., Michigan State University, 1954; M.A., 1955; Ph.D., 1963.
- HEXTER, J. Lawrence, Assistant Professor of Economics  
A.B., University of Minnesota, 1954; M.B.A., Cornell University, 1958; M.A., University of Wisconsin, 1964; Ph.D., 1966.
- HILLE, Stanley J., Assistant Professor of Business Administration  
B.B.A., 1959, Univ. of Minnesota; M.B.A., 1962, Ph.D., 1965,
- HIMES, Robert S., Assistant Professor of Accounting  
B.C.S., Benjamin Franklin University, 1939; M.C.S., 1940; B.S., American University; Ph.D., 1962.
- HINRICHS, Harley H., Assistant Professor of Economics  
B.B.A., University of Wisconsin, 1953; M.A., Purdue University, 1958; Ph.D., Harvard, 1964.

## FACULTY

KOKAT, Robert G., Assistant Professor of Economics and Research Associate, Bureau of Business and Economic Research

B.A., Pennsylvania State University, 1956; M.S., 1957; D.B.A., Indiana University, 1962.

KOURY, Enver M., Assistant Professor of Government and Politics

B.A., George Washington University, 1953; Ph.D., American University, 1958.

MAYOR, Thomas H., Assistant Professor of Economics

A.B., Rice University, 1961; Ph.D., University of Maryland, 1965.

MEYER, Paul A., Assistant Professor of Economics

B.A., Johns Hopkins University, 1961; M.A., Stanford, 1963; Ph.D., 1965.

MIKA, Paul, Assistant Professor of Geography

A.B., University of Pittsburgh, 1954; M.A., George Washington University, 1958; Ph.D., Clark University, 1964.

NASH, Allan N., Assistant Professor of Personnel Administration

B.A., University of Minnesota, 1957; M.A., 1959; Ph.D., 1963.

NOALL, William F., Assistant Professor of Public Relations

B.S., Kent State University, 1957; M.S., Ohio University, 1960.

O'DONNELL, Maurice E., Assistant Professor of Government and Politics

B.S., Eastern Illinois State, 1948; M.S., University of Wisconsin, 1951; Ph.D., 1954.

OLSON, Ronald L., Assistant Professor of Business Administration

B.S., Shippensburg State College, 1960; M.B.A., 1962, Indiana Univ.; C.P.A., 1962, State of Indiana; D.B.A., 1964, Indiana Univ.

ONYEWU, Nicholas D. U., Assistant Professor of Government and Politics

B.A., Howard University, 1958; M.A., 1962; Ph.D., American University, 1966.

PAINE, Frank T., Assistant Professor of Business Administration

B.S., Syracuse University, 1951; M.B.A., 1956; Ph.D., Stanford University, 1963.

PIPER, Don C., Assistant Professor of Government and Politics

B.A., University of Maryland, 1954; M.A., 1958; Ph.D., Duke University, 1961.

RYANS, John K., Jr., Assistant Professor of Marketing

A.B.J., 1954, Univ. of Kentucky; M.S., 1958, Univ. of Tennessee; D.B.A., 1965, Indiana University.

SCHELLENBERGER, Robert E., Assistant Professor of Business Administration

B.B.A., University of Wisconsin, 1958; M.B.A., 1959; Ph.D., University of North Carolina, 1963.

SCHMIEDER, Allan A., Assistant Professor in Geography

B.S., Edinboro State College, 1955; M.A., 1956; Ph.D., Ohio State University, 1963.

SMERK, George M., Assistant Professor of Transportation

B.S., Bradley University, 1955; M.B.A., 1957; D.B.A., Indiana University, 1963; Ph.D., 1963.

SNOW, John W., Assistant Professor of Economics

B.A., University of Toledo, 1962; Ph.D., University of Virginia, 1965.

## FACULTY

- SPYCHALSKI, John C., Assistant Professor of Business Administration  
B.S., 1961, St. Joseph's College, Indiana; M.B.A., 1962, D.B.A., 1965, Indiana University.
- SUELFLOW, James E., Assistant Professor of Business Administration  
B.B.A., 1960; M.B.A., 1961; Ph.D., 1965, Univ. of Wisconsin,
- TERCHEK, Ronald J., Assistant Professor of Government and Politics  
B.A., University of Chicago, 1958; M.A., 1960; Ph.D., University of Maryland, 1965.
- TOSI, Henry L., Jr., Assistant Professor of Business Administration  
B.S., 1958; M.B.A., 1962, Ph.D., 1964, Ohio State University.
- WIEDEL, Joseph W., Assistant Professor in Geography  
B.A., University of Maryland, 1958; M.A., 1963.
- WOLFE, James H., Assistant Professor of Government and Politics  
B.A., Harvard University, 1955; M.A., University of Connecticut, 1958; Ph.D., University of Maryland, 1962.

### *Instructors*

- ANDERSON, Charles R., Instructor in Office Management and Techniques  
B.S., University of Maryland, 1957; M.Ed., 1959.
- BAILEY, William M., Instructor in Economics  
B.A., North Texas State College, 1959.
- CHAPPELL, James D., Jr., Instructor in Business Administration, College of B.P.A.;  
Information Procurement Consultant, Computer Science Center  
A.B., Duke University, 1953; M.S., Columbia University, 1954; C.P.A., Georgia, 1958.
- DONNELLY, James Howard, Jr., Instructor in Business Administration  
B.B.A., 1963, Pace College; M.B.A., 1964, Long Island University.
- FREY, RALPH W., Instructor in Accounting  
B.S., University of Maryland, 1964
- FUREY, Joseph C., Instructor in Economics  
B.A., University of Maryland, 1948.
- GUNTER, Ruby W., Instructor in Office Techniques  
B.S., John B. Stetson University, 1946.
- HAMILTON, Raymond W., Instructor in Economics  
B.A., American University, 1959.
- HISE, Richard T., Instructor in Business Administration  
A.B., Gettysburg College, 1959; M.B.A., University of Maryland, 1961.
- IVANCEVICH, John M., Instructor in Business Administration  
B.S., 1961, Purdue Univ., M.B.A., 1965, Univ. of Maryland.

## FACULTY

- KINERNEY, Eugene, Instructor in Geography  
B.S., University of Kansas City, 1959; M.A., University of Missouri, 1961.
- MARTHINUSS, George L., Jr., Instructor in Business Administration  
B.A., 1962, Gettysburg College; M.B.A., 1965, Univ. of Maryland.
- McCAUL, James R., Instructor in Business Administration  
B.S., 1962, State Univ. of N. Y.; M.S., 1964, Pa. State College.
- NEFFINGER, George G., Instructor in Business Organization  
B.S., University of Florida, 1951; M.A., George Washington University, 1958.
- O'NEILL, Jane H., Instructor in Office Techniques  
B.A., University of Maryland, 1932.
- PEAKE, Charles F., Instructor in Economics  
B.S., East Tennessee State College, 1956; M.S., University of Tennessee, 1958.
- PISANI, Joseph R., Instructor in Business Administration  
B.S., 1960, Fordham Univ.; M.B.A., 1961, Univ. of Calif.
- ROSEN, Louis I., Instructor in Business Administration  
BS., 1964, M.B.A., 1965, Univ. of Maryland.
- SHERMAN, Allan K., Instructor in Business Administration  
A.B., 1963, Brown Univ.; M.B.A., 1965, Univ. of Maryland.
- STRAWSER, Robert H., Instructor in Business Administration  
B.S., 1962, Univ. of Virginia; C.P.A., Virginia
- VAN BEEK, Fritz, Instructor in Economics  
B.A., Netherlands School of Economics, 1961.
- WEINTRAUB, Irvin, Instructor in Economics  
A.B., Johns Hopkins University, 1950; M.S., Columbia University, 1951.
- WEBB, Ronald, Instructor in Accounting  
B.A., Wheaton College, 1964.

## *Lecturers*

- AMUZEGAR, Jahangir, Lecturer in Economics  
B.A., University of Tehran, 1941; M.A., University of Washington, 1948; Ph.D., University of California at Los Angeles, 1955.
- BARBER, Willard F., Lecturer in International Affairs  
A.B., Stanford University, 1928; M.A., 1929; Certificate, National War College, 1948.
- CONRAD Gunter, Lecturer in Economics, Dr. Rer. Pol., University of Heidelberg, 1960
- DAY, ERNEST H., Lecturer in Economics  
A.B., Oberlin College, 1941; LL.B., George Washington University, 1950; M.A., 1955.

## FACULTY

- DURANT, Ronald O., Lecturer in Information Systems and Economics  
A.B., University of Notre Dame, 1959; M.A., Rutgers University, 1960; M.S., University of Wisconsin, 1964.
- FREDERICKSON, H. George, Lecturer in Government and Politics  
B.S., Brigham Young University, 1959; M.P.A., University of California (Los Angeles), 1961.
- GERACI, Philip C., Lecturer in Journalism  
B.S., University of Maryland, 1953; M.A., 1961.
- GIBNEY, M. J., Lecturer in Economics  
B.A., Harvard University, 1934; M.A., University of Pennsylvania, 1952.
- GRAMLEY, Lyle E., Lecturer in Economics  
B.A., Beloit College, 1951; M.A., Indiana University, 1952; Ph.D., 1956.
- GROVES, Paul, Lecturer in Geography  
B.Sc. (Econ.), University College, London, 1956; M.A., University of Maryland, 1960.
- HOGAN, Lawrence J., Lecturer in Public Relations  
B.A., Georgetown University, 1948; LL.B., 1954.
- LARSON, Harold, Lecturer in Government and Politics  
B.A., Morningside College, 1927; M.A., Columbia University, 1928; Ph.D., 1943.
- MEASDAY, Walter S., Lecturer in Economics  
A.B., William and Mary College, 1945; Ph.D., Massachusetts Institute of Technology, 1955.
- MUELLER, Willard F., Lecturer in Economics  
B.S., University of Wisconsin, 1950; M.S., 1951; Ph.D., Vanderbilt University, 1955.
- RATCHFORD, William S., II, Lecturer in Government and Politics, and Executive Secretary of the Maryland County Commissioners Association  
B.A., University of Richmond, 1954; B.S., Johns Hopkins University, 1960; M.A., University of Maryland, 1962.
- SOLES, James R., Lecturer in Government and Politics  
B.S., Florida State University, 1957; M.S., 1961.
- SPENCER, Jean E., Lecturer and Research Associate, Bureau of Governmental Research  
B.A., University of Maryland, 1955; M.A., 1961.
- SPIEGEL, Henry W., Lecturer in Economics  
J.V.D., University of Berlin, 1933; Ph.D., University of Wisconsin, 1939.
- THOMPSON, Daniel R., Lecturer in Government and Politics, and Executive Secretary of the Maryland Municipal League  
B.A., Queens College, 1950; LL.B., Georgetown University, 1960.
- VOLK, Donald J., Lecturer in Geography  
B.A., University of Chicago, 1958; M.A., University of Chicago, 1960.

ZIMRING, Bob, Lecturer in Government and Politics

A.B., University of Illinois, 1960; M.S., University of Wisconsin, 1963.

*Research Associates*

ADAMS, Robert F., Research Associate, Bureau of Business and Economic Research, and Assistant Professor of Economics.

B.A., Oberlin College, 1958; M.A., University of Michigan, 1960; Ph.D., 1963.

DOTTER, LaMar A., Municipal Management Associate, Maryland Technical Advisory Service, Bureau of Governmental Research

B.A., LaSalle College, 1959; M.A., University of Notre Dame, 1961.

FELDMANN, Edward H., Municipal Management Associate, Engineering, Maryland Technical Advisory Service, Bureau of Governmental Research

B.S., Gettysburg College, 1924; B.S., Yale University, 1925; M.C.E., New York University, 1941; M.S., Columbia University, 1955; M.P.A., New York University, 1960.

KOKAT, Robert G., Research Associate, Bureau of Business and Economic Research, and Assistant Professor of Economics, Department of Economics

B.S., Pennsylvania State University, 1956; M.S., 1957; D.B.A., Indiana University, 1962.

KRASSA, Lucie G., Research Associate, Bureau of Business and Economic Research  
Doctor Juris, University of Vienna, 1936.

MESTER, Edmund C., Associate, Bureau of Governmental Research

A.B., University of Maryland, 1948; M.A., 1949.

NASH, Grover E., County Management Associate, Maryland Technical Advisory Service, Bureau of Governmental Research.

B.S., Ohio State University, 1942; M.A., Georgetown University, 1961.

SUTHERLAND, Marie P., Research Associate, Bureau of Governmental Research

B.A., George Washington University, 1950; M.A., University of Chicago, 1952.

*CATALOG OF THE*  
COLLEGE  
OF  
EDUCATION  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*August 31, 1965*

*No. 2*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Published twenty-nine times. Re-entered as second class mail matter under the Act of Congress on August 24, 1912, and second class postage paid at College Park, Maryland.



# Contents

## GENERAL

University Calendar . . . . .	iv	Minimum Requirements for	
Board of Regents . . . . .	v	Academic Retention . . .	7
Officers of the University . . . .	vi	Admission to Teacher	
Standing Committees,		Education . . . . .	7
Faculty Senate . . . . .	x	Certification of Teachers . .	8
The College . . . . .	1	Degrees . . . . .	8
Organization . . . . .	1	Costs . . . . .	9
Facilities . . . . .	2	Remission of Fees . . . . .	9
Special Services . . . . .	2	Definition of Residence and	
Undergraduate Programs . . . . .	4	Non-Residence . . . . .	9
Requirements for Admission	4	Graduate Studies . . . . .	10
General Requirements . . . .	5	Admission . . . . .	10
General Information . . . . .	5	Registration . . . . .	10
Air Force ROTC Programs . .	6	Master's Degree . . . . .	10
Physical Education and		Advanced Graduate Special-	
Health . . . . .	6	ist in Education . . . . .	10
Guidance in Registration . .	7	Doctoral Degrees . . . . .	10

## CURRICULA AND REQUIRED COURSES

Advisors . . . . .	11	Art Education . . . . .	26
Majors and Minors . . . . .	12	Secondary Art Education	
Agricultural and Extension		Curriculum . . . . .	26
Education . . . . .	13	Elementary Art Education	
Early Childhood-Elementary		Curriculum . . . . .	27
Education . . . . .	13	Business Education . . . . .	28
Early Childhood Education .	13	General Business Education	
Area of Specialization in		Curriculum . . . . .	29
Elementary School Phys-		Secretarial Education	
ical Education and Health		Curriculum . . . . .	30
Education . . . . .	17	English Education . . . . .	31
Area of Specialization in		Foreign Language Education .	32
Elementary School Music		Home Economics Education . .	34
Education . . . . .	17	Mathematics Education . . . .	35
Industrial Education . . . . .	17	Music Education . . . . .	37
Industrial Arts Education		Physical Education and Health	
Curriculum . . . . .	18	Education . . . . .	39
Vocational-Industrial . . . .	19	Science Education . . . . .	40
Vocational-Industrial		Social Science Education	
Certification . . . . .	21	Curriculum . . . . .	41
Education for Industry . . . .	22	Speech Education . . . . .	42
Library Science Education . . . .	24	Special Education . . . . .	43
Secondary Education . . . . .	26		

# Contents

## *COURSE OFFERINGS*

Education .....	44	Secondary Education .....	69
Early Childhood-Elementary		General and Academic	
Education .....	54	Education .....	69
Human Development		Business Education .....	71
Education .....	57	Home Economics Education	72
Industrial Education .....	61	Music Education .....	72
Library Science Education ...	68	Special Education .....	75
Faculty .....			78

# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

- 12-16 Monday-Friday—Fall Semester Registration
- 19 Monday—Instruction begins

### NOVEMBER

- 23 Wednesday, after last class—Thanksgiving recess begins
- 28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

- 21 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Tuesday, 8:00 A. M.—Christmas recess ends
- 18 Wednesday—Pre-exam Study Day
- 19-25 Thursday-Wednesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

- 31-Feb. 3 Tuesday-Friday—Spring Semester Registration

### FEBRUARY

- 6 Monday—Instruction begins
- 22 Wednesday—Washington's Birthday, holiday

### MARCH

- 23 Thursday, after last class—Easter recess begins
- 28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

- 10 Wednesday—AFROTC Day
- 24 Wednesday—Pre-exam Study Day
- 25-June 2 Thursday-Friday—Spring Semester Examinations
- 28 Sunday—Baccalaureate Exercises
- 30 Tuesday—Memorial Day, holiday

### JUNE

- 3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

- 19-20 Monday-Tuesday—Registration, Summer Session
- 21 Wednesday—Instruction begins
- 24 Saturday—Classes (Monday schedule)

### JULY

- 4 Tuesday—Independence Day, holiday
- 8 Saturday—Classes (Tuesday schedule)

### AUGUST

- 11 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

- 12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

- 7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

- 5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT, BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### ASSISTANT TO THE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE, RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schultz—*B.S., University of Maryland, 1938; M.S., 1940.*

## DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

## DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

## ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

## DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

## ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

## *Emeriti*

### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

## *Deans of the Schools and Colleges*

### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

### ACTING DEAN OF THE COLLEGE OF ENGINEERING

Russell B. Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY  
Homer W. Schamp, Jr.—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

#### DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1926; *Ph.D.*, *Columbia University*, 1931.

#### ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, *University of Maryland*, 1936.

#### DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

#### DEAN OF THE SCHOOL OF LIBRARY AND INFORMATION SERVICES

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

#### DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

#### DEAN OF THE SCHOOL OF NURSING

Florence M. Gipe—*B.S.*, *Catholic University of America*, 1937; *M.S.*, *University of Pennsylvania*, 1940; *Ed.D.*, *University of Maryland*, 1952.

#### DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

#### DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

#### DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

#### DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

### *Directors of Educational Services and Programs*

#### EXECUTIVE DEAN FOR STUDENT LIFE

Leslie R. Bundgaard—*B.S.*, *University of Wisconsin*, 1948; *M.S.*, 1949; *Ph.D.*, *Georgetown University*, 1954.

#### DEAN OF WOMEN

Helen E. Clarke—*B.S.*, *University of Michigan*, 1943; *M.A.*, *University of Illinois*, 1951; *Ed.D.*, *Teachers College, Columbia University*, 1960.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### ACTING DIRECTOR, COMPUTER SCIENCE CENTER

John P. Menard—*B.A., St. Michael's College, Vt., 1954.*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

#### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

THE COLLEGE OF EDUCATION MEETS THE NEEDS OF THE FOLLOWING classes of students: (1) persons preparing to teach in colleges, secondary schools, elementary schools, kindergarten, and nursery schools; (2) persons preparing to teach classes in special education and to be school librarians; (3) present or prospective teachers who wish to supplement their preparation; (4) students preparing for educational work in the trades and industries; (5) graduate students preparing for teaching, supervisory, or administrative positions; (6) certain students whose major interests are in other fields, but who desire courses in education.

Because of the location of the University in the suburbs of the nation's capital, unusual facilities for the study of education are available to its students and faculty. The Library of Congress, the library of the United States Office of Education, and special libraries of other government agencies are accessible, as well as the information services of the National Education Association, American Council on Education, United States Office of Education, and other organizations, public and private. The school systems of the District of Columbia, Baltimore, and the counties of Maryland offer generous cooperation.

## *Organization*

The College is organized into three departments, an institute, and non-departmental areas. Each of these offers a wide range of programs in teacher education or education specialties.

DEPARTMENT OF EARLY CHILDHOOD-ELEMENTARY EDUCATION. This department offers programs to prepare teachers for nursery school, kindergarten, and primary grades and for all grades in the elementary school.

DEPARTMENT OF SECONDARY EDUCATION. This department is concerned with the preparation of teachers for junior and senior high schools. Teaching majors are offered in the following areas: art, business education, English, foreign languages, home economics, mathematics, music, science, social studies, and speech. A minor is offered in special education. Majors in physical education and agriculture are offered in the College of Physical Education, Recreation, and Health and the College of Agriculture in cooperation with the College of Education.

DEPARTMENT OF INDUSTRIAL EDUCATION. This department offers programs leading to teacher certification in Industrial Arts and Vocational-Industrial Education. It also offers a program in Education for Industry which prepares individuals for supervisor and industrial management positions, and an Industrial Technology program for persons with advanced technical preparation who wish to teach in technical institutes or junior colleges.

INSTITUTE FOR CHILD STUDY. This institute carries on the following activities: (1) it undertakes basic research in human development; (2) it digests and synthesizes research findings from the many sciences that study human

## FACILITIES, SPECIAL SERVICES

beings; (3) it plans, organizes, and provides consultant service programs of direct child study by in-service teachers in individual schools or in municipal, county or state systems; (4) it offers field training to a limited number of properly qualified doctoral students, preparing them to render expert consultant service to schools and for college teaching of human development. The College of Education operates Workshops in Child Development and Education for six weeks each summer. Inquiries should be addressed to Director, Institute for Child Study.

**NON-DEPARTMENTAL AREAS.** These areas are made up of several programs which prepare individuals for certification in special teaching or service fields. Included are programs in special education; school librarianship; school administration and supervision; research; curriculum; history, philosophy and comparative education; social foundations and personnel services in education.

### *Facilities*

The College is housed in two buildings. All departments and special areas with the exception of Industrial Education have their offices and instructional facilities in the new College of Education Building. This building, completed in 1965, was planned with the special needs of teacher education in mind. The Industrial Education Department is housed in the J. Milton Patterson Building. The facilities of this building are devoted exclusively to the work of the Department.

### *Special Services*

The College provides several kinds of special services for faculty, students, and schools and teachers in the field:

#### *1. Bureau of Educational Research and Field Services.*

The Bureau of Educational Research and Field Services has been established to (1) encourage and stimulate basic research bearing on different aspects of the educative process; (2) provide assistance in designing, implementing and evaluating research projects initiated by local school systems; (3) coordinate school systems' requests for consultants with the rich and varied professional competencies that are available on the University faculty. Additional information about the Bureau's services may be obtained from the Director, Bureau of Educational Research and Field Services.

#### *2. Curriculum Laboratory.*

The curriculum laboratory provides students, faculty and teachers in the field with both materials and assistance in the area of curriculum. An up-to-date collection of curriculum materials is maintained. This includes texts, courses of study, study guides, curriculum studies, and bibliographies. The laboratory is equipped to assist students and student teachers with preparation of teaching plans.

### 3. *Educational Technology Center.*

The center is designed to serve as a service facility to faculty and students by providing teaching aids of all kinds, audio-visual equipment and service, instruction in all aspects of instructional materials, aids, and new media. It also will be the center for the development of a future graduate program in educational technology.

### 4. *Nursery School and Kindergarten.*

The University of Maryland operates a nursery school and kindergarten on the campus in which students majoring in Early Childhood Education receive training and practical experience and in which majors in other areas and in other departments also use the resources for observation, child study, and research.

### 5. *Off-Campus Courses.*

Through the University College, a number of courses in education are offered in Baltimore, in other centers in Maryland, and overseas. These courses are chosen to meet the needs of groups of students in various centers. In these centers, on a part-time basis, a student may complete a part of the work required for an undergraduate or a graduate degree. Announcements of such courses may be obtained by addressing requests to the Dean, University College, College Park, Maryland.

### 6. *Reading Center.*

The reading center provides clinical diagnostic and corrective services to a limited number of children. These services are a part of the program in correction and remedial reading offered to teachers on the graduate level.

### 7. *Science Teaching Center.*

The Science Teaching Center maintains a collection of science teaching materials which includes textbooks, films, film strips, pamphlets, apparatus and equipment for students, teachers, and supervisors. The center serves as a depository for courses of study for grades K-16 in science.

### 8. *Student and Professional Organizations.*

The College of Education sponsors two professional organizations: Phi Delta Kappa, the national professional fraternity for men in education, and Iota Lambda Sigma, the national honorary fraternity in industrial education. Both fraternities have large and active chapters and are providing outstanding professional leadership in their fields of service. The College of Education also sponsors a chapter of the National Honorary Society, Kappa Delta Pi, which is open to both men and women in the field of education. The College of Education also sponsors a chapter of the Student National Education Association. This chapter is open to undergraduate students on the College Park campus. A student chapter of the Council for Exceptional Children (NEA) is open to undergraduate and graduate students who are preparing to work with exceptional children.

## UNDERGRADUATE STUDIES

### 9. *University Credential Service.*

The University provides placement service for its qualified students and graduates, helping them to secure the kinds of positions they desire. All graduating seniors on the College Park Campus (except Education for Industry majors) are required to file credentials with this office during the Fall semester of the senior year. The fee, \$5.00, entitles the student to placement service for the annual period ending October 1.

The University Credential Service provides the necessary link between graduates of the College of Education and employment opportunities in the various teaching fields. This is the only place on campus where complete descriptions of teaching ability and personal qualifications of College of Education graduates can be assembled. These records are permanently maintained and will be sent to prospective employers on the request of the teacher or the employer.

Credential Service records are used: (a) for placement in teaching and other school positions. Graduating seniors and alumni may arrange for on-campus interviews by school and college officials who are seeking teaching and administrative personnel. Several schools and colleges arrange for campus visits each year; (b) for shifts of position for experienced teachers seeking promotion; (c) for securing summer employment; (d) in connection with applications for appointment as exchange teachers or for overseas teaching during leaves of absence; (e) for placement during subsequent years by those who do not teach immediately after graduation; (f) for replying to inquiries of employers in fields other than teaching; and (g) for placement of graduate students in college positions in all fields.

## UNDERGRADUATE PROGRAMS

### *Requirements For Admission<sup>1</sup>*

#### FALL SEMESTER

All applications for full-time (nine or more semester hours) undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before July 15, and for both full-time and part-time applications all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by September 1.

Under unusual circumstances, applications will be accepted between July 15 and September 1. Applicants for full-time attendance filing after July

---

<sup>1</sup> See also p. 7 for requirements for admission to teacher education in the junior year.

15 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

### SPRING SEMESTER

The deadline for the receipt of applications for the Spring Semester is January 1.

### UNIVERSITY COLLEGE

The application deadlines and fees given above *do not* apply to students registering in the evening classes offered by the University College.

### *General Requirements*

In selecting students emphasis will be placed upon high marks and other indications of probable success in college rather than upon a fixed pattern of subject matter. Of the sixteen required units, four units of English and one unit of social sciences, natural sciences, and mathematics are required. Additional units in mathematics, natural sciences, and social sciences are desirable for a program that permits the greatest amount of flexibility in meeting the requirements of various College of Education curricula. While a foreign language is desirable for certain programs, no foreign language is required for entrance. Fine arts, trade and vocational subjects are acceptable as electives. Every prospective applicant should be certain that his preparation in mathematics is adequate for any program that he might wish to enter.

Students are referred to the publication *An Adventure in Learning* for a complete statement of requirements for admission to the different curricula in the College of Education.

Candidates for admission whose high school or college records are consistently low are strongly advised not to seek admission to the College of Education.

### *General Information*

Detailed information concerning the General Education Program, fees and expenses, scholarships and awards, student life, and other material of a general nature, may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park. A detailed explanation of the regulations of student and academic life, may be found in the University publication titled, *University General and Academic Regulations*. This is mailed in September and February of each year to all new undergraduate students.

## UNDERGRADUATE STUDIES

Requests for course catalogs for the individual schools and colleges should be directed to the deans of these respective units, addressed to:

### COLLEGES LOCATED AT COLLEGE PARK:

Dean  
(College in which you are interested)  
The University of Maryland  
College Park, Maryland

### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean  
(College in which you are interested)  
The University of Maryland  
Lombard and Greene Streets  
Baltimore 1, Maryland

### *Air Force ROTC Programs*

Two programs in Air Science are offered at the University of Maryland. Both of these programs are voluntary. The successful completion of either program qualifies the student for a reserve commission in the United States Air Force upon graduation. Exceptionally well qualified students may receive a Regular Officer appointment. The two programs are designed to fit the needs of eligible college male students who begin their higher education at either a junior college or a four year college. Emphasis is placed on qualities of leadership and other attributes essential to progressive advancement into positions of increasing responsibility as commissioned officers in the United States Air Force. For details of these programs the student should consult the publication *An Adventure in Learning*, or appropriate Department of Air Science publications.

### *Physical Education and Health*

All undergraduate men and women students who are registered for more than nine semester hours of credit are required to enroll in and successfully complete two prescribed courses in physical education for a total of two semester hours of credit. The successful completion of these courses is required for graduation. These courses must be taken by all eligible students during the first two semesters of attendance at the University, whether they intend to graduate or not. Men and women who have reached their thirtieth birthday are exempt from these courses. The thirtieth birthday must precede the Saturday of registration week. Students who are physically disqualified from taking these courses must enroll in adaptive courses for which credit will be given. A transferring student who can meet the academic requirements of his college and the requirements of the University by completing 30 academic hours will not be required to register for physical education. Students with military service may receive credit for these courses by applying to the Director of the Men's Physical Education Pro-

gram. Students majoring or minoring in physical education, recreation, or health education may meet these requirements by enrolling in special professional courses.

All freshmen students are required to complete satisfactorily one semester of Health Education (Hea. 5) for graduation. Students who have reached their thirtieth birthday are exempt from this requirement. Transfer students who do not have credit in this course, or its equivalent, must complete this requirement.

All students not required to complete the required physical education and/or health courses must elect a comparable number of hours in academic courses in addition to the regular requirements of their program.

### *Guidance in Registration*

At the time of matriculation each student is tentatively assigned to a member of the faculty who acts as the student's personal adviser. The choice of subject areas within which the student will prepare to teach will be made under faculty guidance during the freshman year. The student will confer regularly with the faculty member in the College of Education responsible for his teaching major. While it may be possible to make satisfactory adjustments as late as the junior year for students from other colleges who have not already entered upon the sequence of professional courses, it is highly desirable that the student begin his professional work in the freshman year. *Students who intend to teach* (except Agriculture and Physical Education) *should register in the College of Education*, in order that they may have the continuous counsel and guidance of the faculty directly responsible for teacher education at the University of Maryland.

### *Minimum Requirements for Academic Retention*

All students enrolled since the Spring semester, 1965, must satisfy the provisions of the University's academic retention plan which are detailed on pages 45-49 of the *University General and Academic Regulations*. All students should become familiar with these provisions.

Students are permitted to register for upper division courses (100 or above) only after they have earned a minimum of 56 hours of credit.

### *Admission to Teacher Education*

All students, full or part-time, who are in a teacher education curriculum in any college of the University, must apply to the Admission to Teacher Education Committee for admission to teacher education at approximately the end of the sophomore year. Transfer students with advanced standing must apply at time of transfer. Post-graduate certification students must apply at the beginning of their program. Application forms may be obtained from the College of Education office.

## UNDERGRADUATE STUDIES

In considering applications, the following criteria have been established by the committee:

1. Applicants should be making satisfactory progress toward the required 2.3 grade point average by the time they would normally do their student teaching.
2. Secondary education applicants must show evidence of ability to achieve in courses directly related to their major field on an above average level.
3. Applicants must have at least a 1.75 average in the general education courses they have taken at the time of application.
4. Applicants must be of good moral and ethical character. This will be determined as fairly as possible from advisers' recommendations, records of serious campus delinquencies, etc.
5. Applicants must be physically and emotionally capable of functioning as a teacher. This means freedom from serious chronic illness, emotional instability, and communicable disease, as determined in cooperation with the Health Service and the Counseling Center.
6. Applicants must be free of serious speech defects or problems.

The purpose of the screening procedure associated with admission to teacher education is to insure that graduates of the teacher education program at the University of Maryland will be well prepared for teaching and can be recommended for certification with confidence.

### *Certification of Teachers*

The State Department of Education certifies to teach in the approved public schools of the state only graduates of approved colleges who have satisfactorily fulfilled subject-matter and professional requirements. The several curricula of the College of Education fulfill State Department requirements for certification.

The teacher education program of the College of Education is accredited by the National Council for Accreditation of Teacher Education. The two-year graduate program for the preparation of school administrators and school service personnel is accredited by the Council.

### *Degrees*

The degrees conferred upon students who have met the conditions prescribed for a degree in the College of Education are Bachelor of Arts and Bachelor of Science. Majors in art, English, languages, social sciences, and speech receive the B.A. degree. Mathematics and elementary art majors may receive either degree. All others receive the B.S. degree.

### *Costs*

Actual annual costs of attending the University for an undergraduate student include \$270.00 fixed charges; \$96.00 special fees; \$440.00 board; \$320.00 lodging for Maryland residents, or \$420.00 for residents of other states and countries. A matriculation fee of \$10.00 is charged all new students. A fee of \$10.00 must accompany a prospective students application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee. A charge of \$400.00 for tuition is assessed to all students who are non-residents of the state of Maryland.

*An Adventure in Learning*, the undergraduate catalog of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park.

### *Remission of Fees*

A full time undergraduate student in the College of Education who signs and honors a pledge to teach for two years full-time in the public schools of Maryland immediately following graduation and who remains in good standing academically may receive remission of fixed charges for a maximum of four academic years while enrolled at the University of Maryland. *This opportunity is available to residents of Maryland only.* For further details write to the College of Education.

### *Definition of Residence and Non-Residence*

Students who are minors are considered to be resident students if at the time of their registration their parents have been domiciled in the State of Maryland for at least six months.

The status of the residence of a student is determined at the time of his first registration in the University and may not thereafter be changed by him unless, in the case of a minor, his parents move to and become legal residents of Maryland by maintaining such residence for at least six months. However, the right of the minor student to change from a non-resident status to resident status must be established by him prior to the registration period set for any semester.

Adult students are considered to be residents if at the time of their registration they have been domiciled in Maryland for at least six months provided such residence has not been acquired while attending any school or college in Maryland or elsewhere. Time spent on active duty in the armed services while stationed in Maryland will not be considered as satisfying the six-months period referred to above except in those cases in which the adult was domiciled in Maryland for at least six months prior to his entrance into the armed service and was not enrolled in any school during that period.

## GRADUATE STUDIES

The word "domicile" as used in this regulation shall mean the permanent place of abode. For the purpose of this rule only one domicile may be maintained.

## GRADUATE STUDIES

For graduate study in education, requirements for admission vary with degree or diploma and special area for which the applicant is applying. Both the Department of Education and the Graduate School must be satisfied as to the ability of the student to do graduate work.

Graduate students in education are required to take a test battery either after admission to the Graduate School, or before, if results are needed as admission information. There is a testing fee of \$5.00.

### *Admission*

Application for admission to the Graduate School must be made by August 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline date is generally June 1.

### *Registration*

A graduate student in education must matriculate in the Graduate School. Application for admission to the Graduate School should be made prior to dates of registration on blanks obtained from the office of the Dean of the Graduate School. For further instructions a student should consult the Graduate School Announcements.

### *Master's Degree*

A graduate student in education may matriculate for a Master of Education or a Master of Arts degree. For requirements of these degrees, the student should consult both the Graduate School Announcements and material issued by the College of Education.

### *Advanced Graduate Specialist in Education*

A student who wishes to enter this program must have completed a master's degree or its equivalent and be otherwise acceptable. The student is admitted to the Graduate School on a special non-degree basis. For requirements of this program, the student should consult the bulletin issued by the College of Education.

### *Doctoral Degrees*

Programs leading to a Doctor of Philosophy in education or a Doctor of Education degree are administered for the Graduate School by the Department of Education. For requirements of these degrees, the student should consult both the Graduate School Announcements and the statement of policy relative to doctoral programs in education.

# Curricula

THE UNDERGRADUATE CURRICULA IN THE COLLEGE OF EDUCATION WITH advisers for each curriculum are as follows:

## AGRICULTURAL AND EXTENSION EDUCATION (under College of Agriculture)

V. R. Cardozier

## EARLY CHILDHOOD-ELEMENTARY EDUCATION

### Early Childhood Education

James L. Hymes, Jr.  
Sarah Lou Leeper

Margaret A. Stant

### Elementary Education

Robert Ashlock  
Glenn O. Blough  
Robert V. Duffey  
Albert W. Edgemon  
Mary Anne Hall  
Wayne L. Herman  
Leo W. O'Neill  
Donald W. Pfau

Alvin W. Schindler  
Eric Seidman  
Dorothy D. Sullivan  
V. Phillips Weaver  
David L. Williams  
Robert M. Wilson  
Lillian B. Zachary

## INDUSTRIAL EDUCATION

Edmund D. Crosby  
Nevin Frantz  
Karl E. Gettle  
Kenneth H. Guy  
Paul E. Harrison  
Clois E. Kicklighter

Joseph F. Leutkemeyer  
Donald Maley  
George R. Merrill  
Robert P. Mertens  
Carl S. Schramm  
William F. Tierney

## LIBRARY SCIENCE EDUCATION

Evelyn J. Anderson  
Dale W. Brown

M. Lucia James

## SECONDARY EDUCATION

### Art Education

Edward L. Longley, Jr.

### Business Education

Arthur S. Patrick

### English Education

Marie D. Bryan

Mary Rodgers

Foreign Language Education and Latin Minor

Ann Beusch

Vincent Kelly

### Home Economics Education

Louise Lemmon

Mabel S. Spencer

## GENERAL REQUIREMENTS

### Mathematics Education

Mildred Cole  
Helen Garstens

James Henkelman

### Music Education

Richard Dunham  
Beula B. Eisenstadt

Rose Marie Grentzer

### Physical Education (Men)

Albert W. Woods

### Physical Education (Women)

Wilda Pickett

### Science Education

Phillip DiLavore  
Marjorie Gardner

J. David Lockard

### Social Studies Education

James Farrell  
Robert Fitch  
Jean Grambs

Rao Lindsay  
James Noll  
James Van Ness

## SPECIAL EDUCATION

Dorothy D. Campbell  
Jean R. Hebel  
Franz Huber

Paul Renz  
Betty H. Simms

### *Majors and Minors*

In the Early Childhood-Elementary Curriculum no major or minor is required but students must complete at least 80 hours of academic work which includes an area of concentration of at least 18 hours.

In secondary education, majors only are required except in Speech Education, although minors may be developed in most programs if the student desires one. Specific programs should be consulted for specific information concerning minors.

## AGRICULTURAL AND EXTENSION EDUCATION

This curriculum is designed to prepare students for teaching vocational agriculture in high schools. To obtain full particulars on course requirements, the student should consult the catalog of the College of Agriculture.

## EARLY CHILDHOOD-ELEMENTARY EDUCATION

The Department of Early Childhood-Elementary Education offers two undergraduate curriculums leading to the Bachelor of Science degree:

1. Early Childhood Education—for the preparation of teachers in nursery school, kindergarten, and primary grades (grades one two, and three).
2. Elementary Education—for the preparation of teachers of grades one through six.

Students who wish to become certificated teachers for nursery school and/or kindergarten must follow the Early Childhood Education curriculum (1. above). Students who seek certification for teaching the intermediate grades must follow the Elementary Education curriculum (2. above). Students who plan to teach in the primary grades can achieve certification in either 1. or 2.

### *Area of Academic Concentration*

Students in Early Childhood-Elementary Education are required to develop within their degree programs an Area of Academic Concentration consisting of a minimum of eighteen semester hours, at least twelve semester hours beyond required work in the Area. Approved areas are: Astronomy, Botany, Chemistry, Economics, English, Fine Arts (Arts, Dance, Drama, and Music), Foreign Language, Geography, Geology, History, Mathematics, Natural Sciences (Astronomy, Botany, Chemistry, Geology, Meteorology, Physics, Zoology), Philosophy, Physics, Psychology, Social Science (Economics, Government and Politics, Psychology, Sociology), Sociology, Zoology.

Students are urged to refer to courses offered specifically for ECEED majors under the headings Health and Physical Education, Industrial Education, and Music Education.

## EARLY CHILDHOOD EDUCATION (Nursery-Kindergarten-Primary)

The early childhood education curriculum has as its primary goal the preparation of nursery school, kindergarten, and primary teachers.

## EARLY CHILDHOOD EDUCATION CURRICULUM

Observation and student teaching are done in the University Nursery-Kindergarten School on the campus and in approved schools in nearby communities.

Graduates receive a B.S. degree and meet the requirements for certification for teaching kindergarten and nursery school and primary grades in Maryland. Each student should have one summer of experience in working with children.

FRESHMAN YEAR	Semester	
	I	II
Eng. 1—Composition and American Literature (or Eng. 21)	3	..
Eng. 3—Composition and World Literature.....	..	3
Soc. 1—Sociology of American Life or Phil. 1—Philosophy for Modern Man or Psych. 1—Introduction to Psychology <sup>2</sup>	3	..
G. and P. 1—American Government.....	..	3
Bot. 1—General Botany .....	4	..
Zool. 1—General Zoology .....	..	4
Speech 3—Fundamentals of General American Speech.....	3	..
Art 40—Fundamentals of Art.....	..	3
Hea. 5—Science and Theory of Health.....	2	..
P. E. 2, 4—Physical Education.....	1	1
Approved electives <sup>3</sup> .....	..	2
Total.....	16	16

## SOPHOMORE YEAR

Eng. 4—Composition and World Literature.....	3	..
History (American) .....	3	3
Math. 30—Elements of Mathematics.....	..	4
Mus. 16—Music Fundamentals.....	3	..
Hist. 41—Western Civilization or Hist. 51—The Humanities or Phil. 53—Philosophy of Religion or Soc. 1—Sociology of American Life.....	3	..
Hist. 42—Western Civilization or Hist. 52—The Humanities or Phil. 1—Philosophy for Modern Man or Soc. 14—Urban Sociology .....	..	3
Chem. 1—General Chemistry (4) or Geog. 40—Principles of Meteorology (3) or Geology 1—Geology (3) or Astr. 1— Astronomy (3) or Physics 1—Elements of Physics (3)....	3-4	..
Chem. 3—General Chemistry (4) or F. and N. 5—Food and Nutrition (3) or Nutr. 20—Elements of Nutrition (3).. Approved electives .....	..	3-4 3
Total.....	15-16	16-17

<sup>2</sup> Or Econ. 31—Principles of Economics (3) or Econ. 37—Fundamentals of Economics (3) in the sophomore year.

<sup>3</sup> See page 13 concerning Area of Academic Concentration requirement.

## ELEMENTARY EDUCATION CURRICULUM

	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Ed. 110—Human Development and Learning.....	6	..
ECEEd 115—Activities and Materials in Early Childhood Education .....	3	..
ECEEd 116—Music in Early Childhood Education .....	3	..
ECEEd 153A—The Teaching of Reading.....	..	2
ECEEd 122A—Social Studies in the Elementary School....	..	2
ECEEd 124A—Mathematics in the Elementary School.....	..	2
ECEEd 105A—Science in the Elementary School.....	..	2
ECEEd 123A—The Child and the Curriculum.....	..	2
Geog. 10—General Geography.....	3	..
Approved electives <sup>1</sup> .....	..	5
<b>Total</b> .....	<b>15</b>	<b>15</b>
<b>SENIOR YEAR</b>		
Ed. 111—Foundations of Education.....	3	..
ECEEd 149—Student Teaching in the Elementary School. A.-4 s.h.; B.-4 s.h.; C.-8 s.h.....	8	8
Soc. 5—Anthropology or Soc. 105—Cultural Anthropology or Psych. 5—Mental Hygiene or Psych. 21—Social Psychol- ogy .....	3	..
Approved electives .....	1	7
<b>Total</b> .....	<b>15</b>	<b>15</b>

## ELEMENTARY EDUCATION

This curriculum is designed for regular undergraduate students who wish to qualify for teaching positions in elementary schools. Students who complete the curriculum will receive the Bachelor of Science degree, and they will meet the Maryland State Department of Education requirements for the Standard Professional Certificate in Elementary Education. The curriculum also meets certification requirements in many other states, Baltimore, and the District of Columbia.

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1 (or 21)—Composition and American Literature....	3	..
Eng. 3—Composition and World Literature.....	..	3
Soc. 1—Sociology of American Life or Phil. 1—Philosophy for Modern Man or Psych. 1—Introduction to Psychology	3	..
G. & P. 1—American Government .....	..	3
Bot. 1—General Botany .....	4	..
Zool. 1—General Zoology .....	..	4
Art 40—Fundamentals of Art.....	3	..
Mus. 16—Music Fundamentals .....	..	3
Hea. 5—Science and Theory of Health.....	2	..
P. E.—Physical Education—1, 3 (men); 2, 4 (women).....	1	1
Approved electives <sup>4</sup> .....	..	1-3
<b>Total</b> .....	<b>16</b>	<b>15-17</b>

<sup>4</sup> See page 13 concerning Area of Academic Concentration.

# INDUSTRIAL EDUCATION CURRICULUM

## SOPHOMORE YEAR

Eng. 4—Composition and World Literature.....	3	..
History, American .....	3	3
Geog. 10—General Geography .....	3	..
ECEEd. 52—Introduction to Children's Literature. B.....	2	..
Math. 30—Elements of Mathematics .....	4	..
Math 31—Elements of Geometry .....	..	4
Physical Science: Chem. 1—General Chemistry (4) <i>or</i> Geol. 1—Geology (3) <i>or</i> Geog. 40— Meteorology (3) <i>or</i> Astronomy 1—Introduction to Astronomy (3) .....	..	3-4
Speech 3—Fundamentals of General American Speech.....	..	3
Approved electives .....	..	2
<b>Total.....</b>	<b>15</b>	<b>15-16</b>

## JUNIOR YEAR

	Semester—	
	I	II
Ed. 110—Human Development and Learning .....	6	..
Hist. 41, 42—Western Civilization .....	3	3
Physical Science: Chem. 1 or 3 (4), <i>or</i> Geol. 1 (3), <i>or</i> Astron. 1 (3), <i>or</i> F. & N. 5—Food and Nutrition <i>or</i> Nutr. 20—Ele- ments of Nutrition (3) .....	3-4	..
ECEEd. 105—Science in the Elementary School. B. <sup>5</sup> .....	2	..
ECEEd. 121—Language Arts in the Elementary School. B. <sup>5</sup> ..	..	2
ECEEd. 122—Social Studies in the Elementary School. B. <sup>5</sup> ..	..	2
ECEEd. 124—Mathematics in the Elementary School. B. <sup>5</sup> ..	..	2
ECEEd. 153—The Teaching of Reading. B. ....	2	..
Approved Electives .....	..	7
<b>Total.....</b>	<b>16</b>	<b>16</b>
ECEEd. 149—Student Teaching in the Elementary School. C.	16	..
Ed. 111—Foundations of Education .....	..	3
Geog. 100—Regional Geography of Eastern Anglo-America <i>or</i> Geog. 101—Regional Geography of Western Anglo- America <i>or</i> Geog. 120. Economic Geography of Europe ..	..	3
P. E. 120—Physical Education in the Elementary School (3) <i>or</i> Mus. Ed. 128 — Music for the Elementary School Teacher (2) <i>or</i> ECEEd. 125—Art in the Elementary School (2) .....	..	2-3
Approved electives .....	..	7-9
<b>Total .....</b>	<b>16</b>	<b>15-18</b>

NOTE: One hundred twenty (120) academic credits *plus* the required P.E., and Health are required for graduation. *At least* eighty (80) of the academic credits must be in fields outside Education.

<sup>5</sup> All five of these courses may *not* be taken in one semester. Students will register for two in Semester I or II and the remaining three in the other semester. The distribution shown is one of several possible distributions.

### AREA OF SPECIALIZATION IN ELEMENTARY SCHOOL PHYSICAL EDUCATION AND HEALTH EDUCATION

Students enrolled in the College of Education and majoring in elementary education may pursue an area of specialization in elementary school physical education and health education. Students interested in this area should consult the Dean of the College of Physical Education, Recreation and Health.

### AREA OF SPECIALIZATION IN ELEMENTARY SCHOOL MUSIC EDUCATION

Students enrolled in the College of Education and majoring in elementary education may pursue an area of specialization in elementary school music education, and thereby qualify for the Bachelor of Science Certificate in Special Subjects. In order to fulfill requirements in this area, the following courses should be taken in addition to those required in the Elementary Education Curriculum:

Music 1 (3); Music 8 (3); Music 160 or 161 (2); Music 70, 71 (4, 4); Music 80, 81 (2, 2); Applied Music; Piano (8), Voice (4); and Mus. Ed. 139 (2) in place of Mus. Ed. 128 (2) in the senior year.

### ART EDUCATION CURRICULUM—ELEMENTARY (See page 27)

## INDUSTRIAL EDUCATION

Three curriculums are administered by the Industrial Education Department: (1) Industrial Arts Education. (2) Vocational-Industrial Education, and (3) Education for Industry. The overall offering includes both undergraduate and graduate programs leading to the degrees of: Bachelor of Science, Master of Education, Master of Arts, Doctor of Education, and Doctor of Philosophy.

The industrial arts education curriculum prepares persons to teach industrial arts at the secondary school level. It is a four-year program leading to a Bachelor of Science degree. While trade or industrial experience contributes significantly to the background of the industrial arts teacher, previous work experience is not a condition of entrance into this curriculum. Students who are enrolled in the curriculum are encouraged to obtain work in industry during the summer months. Industrial arts as a secondary school subject area is a part of the general education program characterized by extensive laboratory experiences.

The vocational-industrial curriculum may lead either to certification as a vocational-industrial teacher with no degree involved or to a Bachelor of Science degree, including certification. The University of Maryland is designated as the institution which shall offer the "Trade and Industrial"

## INDUSTRIAL EDUCATION CURRICULUM

certification courses and hence the courses which are offered are those required for certification in Maryland. The vocational-industrial curriculum requires trade competence as specified by the *Maryland State Plan for Vocational Education*. A person who aspires to take the certification courses should review the state plan and may well contact Maryland State Department of Education officials. If the person has in mind teaching in a designated city or county he may discuss his plans with the vocational-industrial official of that city or county inasmuch as there are variations in employment and training procedures.

## INDUSTRIAL ARTS EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1—Composition and American Literature .....	3	..
Eng. 3—Composition and World Literature or .....	..	3
Eng. 4—Composition and World Literature .....	..	3
Soc. 1—Sociology of American Life or Phil. 1—Philosophy for Modern Man or Psych. 1—Introduction to Psychology .....	3	..
P. Ed. 1, 3—Physical Activities .....	1	1
Sp. 1—Public Speaking .....	3	..
I. Ed. 1—Mechanical Drawing .....	2	..
I. Ed. 2—Elementary Woodworking .....	3	..
I. Ed. 12—Shop Calculations .....	..	3
Art —Art Elective or .....	..	3
Phil. —Philosophy Elective .....	..	..
Health 5—Science and Theory of Health .....	..	2
I. Ed. 21—Mechanical Drawing .....	..	2
I. Ed. 22—Machine Woodworking I .....	..	3
Total .....	15	17
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature or .....	3	..
Eng. 3—Composition and World Literature .....	..	..
Hist. 21—History of U. S. to 1865, or .....	3	..
Hist. 22—History of U. S. since 1865 .....	..	3
Hist. —History Elective .....	..	3
Phys. 1 2—Elements of Physics (Mechanics and Heat and Sound) .....	3	3
I. Ed. 28—Electricity I .....	3	..
I. Ed. 33—Automotives I .....	3	..
I. Ed. 41—Architectural Drawing .....	2	..
Math. 10—Introduction to Mathematics .....	..	3
I. Ed. 48—Electricity II .....	..	3
I. Ed. 23—Arc and Gas Welding .....	..	1
I. Ed. 110—Foundry .....	..	1
Total .....	17	14

## INDUSTRIAL EDUCATION CURRICULUM

### JUNIOR YEAR

Chem. 1, 3—General Chemistry .....	4	4
Ed. 110—Human Development and Learning.....	6	..
Ed. 111—Foundations of Education .....	..	3
I. Ed. 69—Machine Shop Practice I.....	3	..
I. Ed. 26—General Metal Work.....	..	3
I. Ed. 111—Laboratory Practices in Industrial Arts Education .....	..	3
I. Ed. 34—Graphic Arts I.....	..	3
Elec.—Elective (Laboratory) .....	4	..
Elec.—Elective (Unspecified) .....	..	3
<b>Total.....</b>	<b>17</b>	<b>19</b>

### SENIOR YEAR

I. Ed. 140—Curriculum, Instruction and Observation, Ind. Ed. ....	3	..
I. Ed. 148—Student Teaching in Secondary Schools.....	8	..
I. Ed. 145—Principles and Methods of Secondary Education .....	3	..
I. Ed. 164—Shop Organization and Management.....	..	3
I. Ed. 166—Educational Foundations of Industrial Arts....	..	2
Econ. 37—Fundamentals of Economics.....	..	3
Ed.—Electives .....	..	6
Elec.—Electives (Unspecified) .....	..	3
<b>Total.....</b>	<b>14</b>	<b>17</b>

## VOCATIONAL-INDUSTRIAL

The vocational-industrial curriculum is a four-year program of studies leading to a Bachelor of Science degree in education. It is intended to develop the necessary competencies for the effective performance of the tasks of a vocational teacher. In addition to establishing the adequacy of the student's skills in a particular trade and the development of instructional efficiency, the curriculum aims at the professional and cultural development of the individual. Courses are included which would enrich the person's scientific, economic, psychological and sociological understandings. The vocational-certification courses for the state of Maryland are a part of the curriculum requirements.

Persons pursuing this curriculum must present documentary evidence of having an apprenticeship or comparable learning period and journeyman experience. This evidence of background and training is necessary in order that the trade examination phase of the curriculum may be accomplished.

Persons having completed the necessary certification courses prior to working on the degree program may use such courses toward meeting graduation requirements. However, after certification course requirements have been met, persons continuing studies toward a degree must take courses in line with the curriculum plan and University regulations. (e.g.)

## INDUSTRIAL EDUCATION CURRICULUM

junior level courses cannot be taken until the student has reached full junior standing.

### VOCATIONAL-INDUSTRIAL FOUR YEAR PROGRAM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1—Composition and American Literature .....	3	..
Eng. 3—Composition and World Literature or		
Eng. 4—Composition and World Literature .....	..	3
Soc. 1—Sociology of American Life.....	3	..
Sp. 1—Public Speaking .....	3	..
Econ. 37—Fundamentals of Economics .....	..	3
I. Ed. 12—Shop Calculations .....	3	..
Math. 10—Introduction to Mathematics.....		
or 3—Fundamentals of Mathematics.....	..	3
P. E 1, 3—Physical Activities.....	1	1
Health 5—Science and Theory of Health.....	..	2
	<hr/>	<hr/>
Total .....	13	12
<b>SOPHOMORE YEAR</b>		
Eng. 3—Composition and World Lit. or		
Eng. 4—Composition and World Lit. ....	3	..
Art —Art Elective or		
Phil. —Philosophy Elective .....	..	3
Hist. 21—History of the U. S. to 1865, or.....	3	..
Hist. 22—History of the U. S. since 1865.....	..	3
Hist. —History Elective .....	..	3
Physical Sciences .....	3	3
Psych. I—Introduction to Psychology.....	3	..
Chem. 1—Zool. I, Geog. 30 .....	..	4
	<hr/>	<hr/>
	12	13
Trade Examination .....	20	
<b>JUNIOR YEAR</b>		
I. Ed. 150—Training Aids .....	..	3
I. Ed. 165—Modern Industry .....	3	..
Ed. 110—Human Development and Learning.....	6	..
I. Ed. 168—Occupational Analysis and Course Construction	3	..
Chem. III—Botany I, Geo. 40.....	4	..
I. Ed. 171—Principles and History of Voc. Ed.....	..	3
I. Ed. 150—Tests and Measurements.....	..	3
Approved Electives .....	..	3
	<hr/>	<hr/>
Total.....	16	12

## INDUSTRIAL EDUCATION CURRICULUM

### SENIOR YEAR

I. Ed. 140—Curriculum, Instruction and Observation.....	3	..
I. Ed. 145—Principles and Methods of Sec. Ed.....	3	..
I. Ed. 148—Student Teaching in Secondary Schools.....	8	..
Ed. 161—Principles of Guidance.....	3	..
Electives .....	..	6
Ed. 111—Social Foundations of Education.....	..	3
I. Ed. 164—Shop Organization and Management.....	..	3
Ed. Electives .....	..	2
Total.....	17	14

**STUDENT TEACHING REQUIREMENT.**—Persons currently teaching in the secondary schools with three or more years of satisfactory experience at that level are not required to take Ind. Ed. 148—Student Teaching in Secondary Schools. Evidence of satisfactory teaching experience shall be presented in the form of written statements from the principal, area supervisor, and department head in the school where such teaching is done. Instead of the eight credits required for students teaching, the individual meeting the above qualifications will have eight additional semester hours of elective credits.

**ELECTIVE CREDITS.**—Courses in history and philosophy of education, sociology, speech, psychology, economics, business administration, and other areas may be taken with the permission of the student's adviser. Elective courses in the technical area (shop and drawing) will be limited to courses and subjects not covered in the trade training experience. Courses dealing with advanced technology and recent improvements in field practices will be acceptable.

### VOCATIONAL-INDUSTRIAL CERTIFICATION

A person to become certified as a Trade, Industrial and Service Occupations teacher in the State of Maryland, must successfully complete 18 credit hours of instruction.

The following courses must be included in the 18 credit hours of instruction:

- I.Ed. 50—Methods of Teaching
- I.Ed. 164—Laboratory Organization and Management
- I.Ed. 157—Tests and Measurements
- I.Ed. 169—Occupational Analysis and Course Construction

The remainder of the credit hours shall be met through the election of the following courses:

- I.Ed. 150—Training Aids Development
- I.Ed. 161—Principles of Vocational Guidance
- I.Ed. 165—Modern Industry
- I.Ed. 167—Problems in Occupational Education
- I.Ed. 171—History and Principles of Vocational Education
- Ed. 161—Introduction to Counseling and Pupil Service

## INDUSTRIAL EDUCATION CURRICULUM

Ed. 162—Mental Hygiene in the Classroom

Psych. 110—Educational Psychology or its equivalent

A person in vocational-industrial education may use his certification courses toward a Bachelor of Science degree. In doing so the general requirements of the University and College of Education must be met. A maximum of twenty semester hours of credit may be earned through examination in the trade in which the student has competence. Prior to taking the examination, the student shall provide documentary evidence of his apprenticeship or learning period and journeyman experience. For further information about credit by examination refer to the publication *University General and Academic Regulations*.

## EDUCATION FOR INDUSTRY

The Education for Industry curriculum is a four-year program leading to a Bachelor of Science degree. The purpose of the program is to prepare persons for jobs within industry and, as such it embraces four major areas of competence, (a) technical competence, (b) human relations and leadership competence, (c) communications competence, and (d) social and civic competence. The student who is enrolled in this curriculum is required to obtain work in industry in accordance with the plan described in the course, Industrial Education 84, 124.

FRESHMAN YEAR	Semester—	
	I	II
Eng. 1—Composition and American Literature .....	3	..
Eng. 3—Composition and World Literature or		
Eng. 4—Composition and World Literature .....		3
Soc. 1 or Anth 1—Sociology of American Life or		
Anthropology .....	3	..
Ind. Ed. 1—Mechanical Drawing I .....	2	..
Ind. Ed. 12—Shop Calculations .....	3	..
Ind. Ed. 21—Mechanical Drawing II .....	..	2
Ind. Ed. 22—Woodworking II .....	3	..
Ind. Ed. 23—Arc and Gas Welding .....	..	1
Ind. Ed. 69—Machine Shop Practice I .....	..	3
Ind. Ed. 110—Foundry .....	..	1
P. E. 1, 3—Physical Activities .....	1	1
Math. 10—Mathematics .....	..	3
<b>Total .....</b>	<b>15</b>	<b>14</b>

# INDUSTRIAL EDUCATION CURRICULUM

## SOPHOMORE YEAR

Art—Art Elective .....	..	3
Eng. 3—Composition and World Literature or		
Eng. 4—Composition and World Literature .....	3	..
Ind. Ed. 24—Sheet Metal Work .....	2	..
B. A. 10—Organization and Control .....	3	..
Sp. 7—Public Speaking .....	..	2
Phys. 1, 2—Elements of Physics (Mechanics and Heat and Sound) (Magnetism, Electricity and Optics) or		
Phys. 10, 11—Fundamentals of Physics (Mechanics and Heat) (Sound, Optics, Magnetism, Electricity) .....	3 or 4	3 or 4
Math. 11—Introduction to Mathematics .....	3	..
Health 5—Science and Theory of Health .....	..	2
Hist. 42—History of Western Civilization .....	..	3
Econ. 37—Fundamentals of Economics .....	..	3
Ind. Ed. 84—Organized and Supervised Work Experience ..	3	..
<b>Total</b> .....	<b>17 or 18</b>	<b>16 or 17</b>

## JUNIOR YEAR

	Semester	
	I	II
History Elective .....	3	..
Psych. 1 — Introduction to Psychology .....	3	..
Psych. 5 — Applied Psychology .....	..	3
Chem. 1 3—General Chemistry .....	4	4
Econ. 160—Labor Economics .....	3	..
Ind. Ed. 124—Organized and Supervised Work Experience	3	..
Ind. Ed. 143-144—Industrial Safety Education .....	2	2
B.A. 160—Personnel Management .....	..	3
Soc. 115—Industrial Sociology .....	..	3
Electives .....	3	3
<b>Total</b> .....	<b>21</b>	<b>18</b>

## SENIOR YEAR

B.A. 161—Personnel Management Techniques or .....	..	..
B.A. 130—Business Statistics I .....	3	..
B.A. 163—Industrial Relations .....	3	..
B.A. 169—Production Management .....	..	3
Ind. Ed. 165—Modern Industry .....	3	..
Ind. Ed. 125—Industrial Training in Industry or	3	..
Ind. Ed. 175—Recent Technological Developments in Products and Processes .....	..	..
Psych. 161—Industrial Psychology .....	..	3
Electives .....	5	7
<b>Total</b> .....	<b>14</b>	<b>16</b>

## LIBRARY SCIENCE EDUCATION

All students anticipating work in Library Science Education should consult with advisers in this area at the beginning of freshman year. Students enrolled in this curriculum will pursue a B.A. degree with an area of concentration of thirty-six hours in one of the following: Humanities, Social Sciences, Science, or Foreign Languages. Students may concentrate in a subject area subsumed under one of these four fields, or they may chose a broad spectrum of courses in one of the four areas under the guidance of their adviser. The minor of eighteen hours will be Library Science Education.

All students who pursue a degree in Library Science Education are required to complete two years (twelve semester hours) of the same foreign language on the College level, or the equivalent. Students who have studied French, German, or Spanish for two or more years in high school, are required to take the Foreign Language Placement Examination before they continue their study of the language concerned. Students who are placed by the examination in French, German, or Spanish 6 (the third College semester) are required to take six additional hours of that language. Students who are placed in French, German, or Spanish 7 (the fourth college semester) are required to take three additional hours of that language. Students who are placed in French or Spanish 11, or German 9 (the fifth college semester) are not required to take any further courses in that language. Students who have studied languages other than French, German, or Spanish, or who have lived for two or more years in a foreign country where a language other than English prevails, shall be placed by the chairman of the respective language section, if feasible, or by the Head of the Department of Foreign Languages. Native speakers of a foreign language shall satisfy the foreign language requirement by taking twelve hours of English.

Students in Library Science Education will complete eight semester hours in Directed Library Experience as their student teaching requirement. It will involve a half day in school, five days per week, for sixteen weeks. This period will be divided into two sections, with eight weeks spent in an elementary school and eight weeks in a secondary school. A concurrent weekly seminar will also be a part of this experience. Students completing this curriculum will be eligible for certification as elementary or secondary school librarians.

Students who have taken an undergraduate program in Library Science Education may apply for examination to exempt certain required courses in the masters degree program in the graduate School of Library and Information Services. Upon satisfactory evidence of mastery of the subject matter of these required courses, they would be able to substitute appropriate alternate graduate level offerings.

# LIBRARY SCIENCE EDUCATION CURRICULUM

## LIBRARY SCIENCE EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng 1—Composition .....	3	..
Eng. 3—Composition and World Literature .....	..	3
Social Science (Economics, Geography, Government and Politics, Sociology, Psychology, or Anthropology) .....	3	3
P.E. 1, 3 (men), P.E. 2, 4 (women) .....	1	1
Art, Music, or Philosophy .....	3	..
Mathematics 3—Fundamentals of Mathematics .....	..	4
Science .....	3	..
Science (with laboratory) .....	..	4
Foreign Language or Elective .....	3	3
<b>Total</b> .....	<b>16</b>	<b>18</b>
<b>SOPHOMORE YEAR</b>		
Speech 1—Public Speaking .....	3	..
English 4—Composition and World Literature .....	3	..
History (American or Non-American) .....	3	3
Foreign Language or Elective .....	3	3
Health—Science and Theory of Health .....	..	2
Area of Concentration .....	6	9
<b>Total</b> .....	<b>18</b>	<b>17</b>
	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Education 110—Human Development of Learning .....	6	..
Library Science Education 120—Introduction to Librarianship .....	3	..
Library Science Education 122—Basic Reference and Information Sources .....	3	..
Library Science Education 126—Cataloging and Classification of Library Materials .....	..	3
Library Science Education 128—School Library Administration and Service .....	..	3
Area of Concentration .....	3	6
Electives .....	3	6
<b>Total</b> .....	<b>18</b>	<b>18</b>
<b>SENIOR YEAR</b>		
Education 111—Foundations of Education .....	3	..
Library Science Education 130—Library Materials for Children .....	3	..
Library Science Education 132—Library Materials for Youth .....	3	..
Secondary Education 148 and Early Childhood-Elementary Education 149 (4 each)—Directed Library Experience with Seminar .....	..	8
Area of Concentration .....	6	6
Electives .....	3	3
<b>Total</b> .....	<b>18</b>	<b>17</b>

## ART EDUCATION CURRICULUM

### SECONDARY EDUCATION

Students enrolled in this curriculum will meet the University general education requirements, plus the following:

All students who pursue the B.A. degree in secondary education are required to complete two years (12 semester hours) of the same foreign language on the college level, or the equivalent. Students who have studied French, German, or Spanish for two or more years in high school, or for two or three semesters in another college or university are required to take the Foreign Language Placement Examination before they continue or resume their study of the language concerned. Students who are placed in French, German, or Spanish 6 (the third college semester) are required to take six additional hours of that language. Students who are placed in French, German or Spanish 7 (the fourth college semester) are required to take three additional hours of that language. Students who are placed in French or Spanish 11, or German 9 (the fifth college semester) are not required to take any further courses in that language. Students who have studied languages other than French, German, or Spanish, or who have lived for two or more years in a foreign country where a language other than English prevails, shall be placed by the chairman of the respective language section, if feasible, or by the Head of the Department of Foreign Languages. Native speakers of a foreign language shall satisfy the foreign language requirement by taking twelve hours of English.

All students who elect the secondary education curriculum will fulfill the preceding *general* requirements and also prepare to teach one or more school subjects which will involve meeting *specific* requirements in *particular* subject matter fields.

The Bachelor of Arts degree is offered in the teaching fields of art, English, foreign languages, mathematics, social science, and speech. The Bachelor of Science degree is offered in business education, home economics, mathematics, music, and science.

### ART EDUCATION

Students in art education enroll in one of two programs, elementary or secondary art education. The proposed programs are listed below:

#### SECONDARY ART EDUCATION CURRICULUM

FRESHMAN YEAR	Semester	
	I	II
Eng. 1—Composition and American Literature .....	3	..
Eng. 3—Composition and World Literature .....	..	3
Social Science requirement .....	3	3
Speech 1—Public Speaking .....	..	3
Art 12—Basic Design .....	3	..
Art 16—Drawing .....	..	3
Hea. 5—Science and Theory of Health.....	2	..
P.E. 1, 3 (men) P.E. 2, 4 (women) .....	1	1
Foreign Language .....	3	3
Total .....	15	16

## ART EDUCATION CURRICULUM

### SOPHOMORE YEAR

Eng. 4—Composition and World Literature .....	3	..
Foreign Language or Electives .....	3	3
Mathematics (either semester) .....	..	3-4
Art 60, 61—Art History .....	3	3
Art 17—Basic Painting .....	..	3
Speech 14—Stagecraft .....	3	..
Cr. 20—Ceramics .....	..	2
Electives .....	3	3
<b>Total</b> .....	<b>15</b>	<b>17-18</b>

### JUNIOR YEAR

Ed. 110—Human Development and Learning .....	6	..
American History and History of Western Civilization ....	3	3
Science or Mathematics .....	3-4	3-4
A.D. 30—Lettering .....	..	3
Art 126—Life Class .....	..	3
Art 119—Graphics .....	3	..
Art 118—Sculpture .....	3	..
Electives in Art <sup>1</sup> .....	..	6
<b>Total</b> .....	<b>18-19</b>	<b>18-19</b>

### SENIOR YEAR

Ed. 111—Foundations of Education .....	3	..
Electives <sup>1</sup> .....	3-5	..
Electives in Art <sup>6</sup> .....	10	10
Sec. Ed. 140—Curriculum, Instruction, Observation in Art ..	..	3
Ed. 147—Audio-Visual Education .....	..	3
Sec. Ed. 145—Principles and Methods in Secondary Education ..	..	3
Sec. Ed. 148—Student Teaching in the Secondary School ..	..	8
<b>Total</b> .....	<b>16-18</b>	<b>17</b>

## ELEMENTARY ART EDUCATION CURRICULUM

### FRESHMAN YEAR

	Semester	
	I	II
Eng. 1, 3—Composition and Literature .....	3	3
Social Science required .....	3	3
Speech 1—Public Speaking .....	3	..
Art 12—Basic Design or Art 40—Fundamentals of Art ....	3	..
Art 16—Drawing .....	..	3
Hea. 5—Science and Theory of Health .....	..	2
P.E. 1, 3 (men) P.E. 2, 4 (women) .....	1	1
Foreign Language or electives .....	3	3
<b>Total</b> .....	<b>16</b>	<b>15</b>

<sup>6</sup> Art Electives must be chosen with the approval of the advisor and of the 16 credit hours required in the secondary program at least 4 must be in crafts.

## ART EDUCATION CURRICULUM

### SOPHOMORE YEAR

Eng. 4—Composition and World Literature .....	..	3
Science requirement .....	3-4	3-4
Mathematics 3—Fundamentals of Math. ....	4	..
Art 60, 61—Art History .....	3	3
Art 17—Basic Painting .....	..	3
Art 20—Introduction to Art .....	3	..
Cr. 20—Ceramics .....	..	2
Foreign Languages or electives .....	3	3
<b>Total</b> .....	<b>16-17</b>	<b>17-18</b>

### JUNIOR YEAR

	<i>Semester</i>	
	<i>I</i>	<i>II</i>
Ed. 110—Human Development and Learning .....	6	..
American History and History of Western Civilization ....	3	3
Foreign Languages or Electives .....	3	3
Cr. 102—Creative Crafts .....	2	..
Art 118—Sculpture .....	..	3
Sp. 14—Stagecraft .....	3	..
Electives in Art <sup>1</sup> .....	..	7-9
<b>Total</b> .....	<b>17</b>	<b>16-18</b>

### SENIOR YEAR

Ed. 111—Foundations of Education .....	3	..
ECEED. 125—Art in the Elementary School .....	2	..
Electives in Art <sup>7</sup> .....	7-9	..
Electives .....	3	..
ECEED. 140—Curriculum Instruction and Observation in Art .....	..	3
Ed. 147—Audio-Visual Ed. ....	..	3
ECEED. 123—The Child and the Curriculum .....	..	3
ECEED. 149—Student Teaching in the Elementary School ..	..	8
<b>Total</b> .....	<b>15-17</b>	<b>17</b>

## BUSINESS EDUCATION

Two curricula are offered for the preparation of teachers of business subjects. The general business education curriculum qualifies for teaching all business subjects except shorthand. Providing thorough training in general business, including economics, this curriculum leads to teaching positions on both junior and senior high school levels.

The secretarial education curriculum is adapted to the needs of those who wish to become teachers of shorthand as well as other business subjects.

<sup>7</sup> Art Electives must be chosen with the approval of the advisor and of the 16 credit hours required in the elementary program at least (4) must be in crafts.

# BUSINESS EDUCATION CURRICULUM

## GENERAL BUSINESS EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1, 3—Composition and American Literature .....	3	3
Fine Arts and Philosophy Requirement .....	3	..
Speech 1—Public Speaking .....	..	3
B.A. 10—Introduction to Business .....	3	..
Geog. 15—Introduction to Economic Geography .....	..	3
Math. 10, 11—Introduction to Mathematics .....	3	3
Econ. 4—Economic Developments .....	3	..
O.T. 1, 2—Principles and Intermediate Typewriting .....	2	2
P.E. 2, 4 (Women) P.E. 1, 3 (Men) .....	1	1
Health 5—Science and Theory of Health .....	..	2
Total .....	18	17
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature .....	3	..
History Requirement .....	3	3
Econ. 31, 32—Principles of Economics .....	3	3
O.T. 10—Office Typewriting Problems .....	2	..
Social Science Requirement .....	..	3
O.T. 14—Survey of Office Machines .....	..	2
B.A. 20, 21—Principles of Accounting .....	3	3
Science Requirement .....	4-3	3-4
Total .....	17-18	17-18
<b>JUNIOR YEAR</b>	I	II
Ed. 110—Human Development and Learning .....	6	..
B.A. 100—Office Operations and Management .....	3	..
B.A. 166—Business Communications .....	..	3
B.A. 101—Electronic Data Processing .....	..	3
B.A. 149—Marketing Principles and Organization .....	3	..
B.A. 180—Business Law .....	..	3
B.A. 140—Business Finance .....	3	..
Elect 100 level course in Economics .....	..	3
Elective .....	..	3
Total .....	15	15
<b>SENIOR YEAR</b>		
Ed. 111—Foundations of Education .....	3	..
B.A. 102—Electronic Data Processing Applications .....	3	..
Sec. Ed. 140—Curriculum, Instruction, and Observation— Business Subjects .....	3	..
Sec. Ed. 145—Principles and Methods of Secondary Education .....	..	3
B.Ed. 100—Techniques of Teaching Office Skills .....	..	3
Sec. Ed. 148—Student Teaching in the Secondary Schools .....	..	8
Electives <sup>a</sup> .....	6	..
Total .....	15	14

<sup>a</sup> A minimum of 55 semester hours of courses in Economics, Business Administration and Office Techniques are required.

## BUSINESS EDUCATION CURRICULUM

### SECRETARIAL EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1, 3—Composition and American Literature . . . . .	3	3
Fine Arts or Philosophy Requirements . . . . .	3	..
Math. 10—Introduction to Mathematics . . . . .	3	..
Speech 1—Public Speaking . . . . .	..	3
O.T. 1—Principles of Typewriting (If exempt, B.A. 10) . . . . .	2	..
O.T. 2—Intermediate Typewriting . . . . .	..	2
O.T. 12, 13—Principles of Shorthand I, II . . . . .	3	3
Social Science Requirement . . . . .	..	3
P.E. 2, 4 (Women) P.E. 1, 3 (Men) . . . . .	1	1
Health 5—Science and Theory of Health . . . . .	..	2
<b>Total</b> . . . . .	<b>15</b>	<b>17</b>
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature . . . . .	..	3
History Requirement . . . . .	3	3
Science Requirement . . . . .	3-4	4-3
Econ. 31, 32—Principles of Economics . . . . .	3	3
O.T. 10—Office Typewriting Problems . . . . .	2	..
O.T. 14—Survey of Office Machines . . . . .	..	2
O.T. 17—Advanced Shorthand and Transcription . . . . .	3	..
O.T. 19—Problems in Transcription . . . . .	..	3
<b>Total</b> . . . . .	<b>14-15</b>	<b>17-18</b>
<b>JUNIOR YEAR</b>		
Ed. 110—Human Development and Learning . . . . .	6	..
B.A. 20, 21—Principles of Accounting . . . . .	3	3
B.A. 100—Office Operations and Management . . . . .	3	..
O.T. 110—Administrative Secretarial Procedures . . . . .	..	3
B.A. 166—Business Communications . . . . .	..	3
Econ. 140—Money and Banking (or B.A. 140) . . . . .	3	..
B.A. 180—Business Law . . . . .	..	3
Elective <sup>a</sup> . . . . .	..	3
<b>Total</b> . . . . .	<b>15</b>	<b>15</b>
<b>SENIOR YEAR</b>		
Ed. 111—Foundations of Education . . . . .	3	..
O.T. 114—Secretarial Office Practice . . . . .	3	..
B.A. 101—Electronic Data Processing . . . . .	3	..
B.Ed. 100—Techniques of Teaching Office Skills . . . . .	..	3
Sec. Ed. 140—Curriculum, Instruction and Observation— Business Subjects . . . . .	3	..
Sec. Ed. 145—Principles and Methods of Secondary Education . . . . .	..	3
Sec. Ed. 148—Student Teaching in Secondary Schools . . . . .	..	8
Elective <sup>a</sup> . . . . .	5	3
Elective from Ed. 147, Ed. 150, EcEEEd. 153 . . . . .	..	..
<b>Total</b> . . . . .	<b>17</b>	<b>17</b>

<sup>a</sup> A minimum of 55 semester hours of courses in Economics, Business Administration and Office Techniques are required.

## ENGLISH EDUCATION

A major in English requires 51 semester hours as follows:

English 1, 3, 4, 8, 115, 116; and 150 or 151; 101; and 12 hours of English electives.

Related fields: History 41-42 or 51-52 or 53-54; Speech 1 and 13.

A minor in English requires 27 semester hours. It includes the required freshman and sophomore English courses and 18 semester hours of electives approved by the adviser.

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1—Composition and American Literature .....	3	..
Social Science Requirement .....	3	3
Speech 1—Public Speaking .....	..	3
Foreign Language .....	3	3
Mathematics Requirement .....	3-4	..
Science Requirement .....	..	3-4
P.E. 1, 3 (Men); P.E. 2, 4 (Women) .....	1	1
History Requirement .....	3	3
Health 5—Science and Theory of Health .....	..	2
Total .....	16-17	18-19
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature .....	3	3
Speech 13—Oral Interpretation .....	..	3
Hist. 41, 42—Western Civilization <sup>10</sup> .....	3	3
Foreign Language .....	3	3
Science Requirement .....	3-4	..
Fine Arts or Philosophy .....	3	3
Elective .....	..	3
Total .....	15-16	15
<b>JUNIOR YEAR</b>		
Eng. 8—College Grammar .....	3	..
Ed. 110—Human Development and Learning .....	6	6
Eng. 115, 116—Shakespeare .....	3	3
Eng. 150 or 151—American Literature .....	3	..
Eng. 160—Advanced Expository Writing .....	3	..
Eng. Elective (period) .....	..	3
Eng. Elective (type) .....	3	..
Elective .....	..	3
Total .....	15	15

<sup>10</sup> or Hist. 51, 52 Humanities, or Hist. 53, 54 History of England and Great Britain.

## FOREIGN LANGUAGE EDUCATION

### SENIOR YEAR

Sec. Ed. 140—Curriculum, Instruction, and Observation . . .	3	.
Sec. Ed. 145—Principles and Methods of Secondary Education . . . . .	3	..
ECEEd. 153 . . . . .	3	..
Sec. Ed. 148—Student Teaching in Secondary School . . . .	8	..
Eng. Elective (major figure) . . . . .	..	3
Eng. 101—History of English Language . . . . .	..	3
Ed. 111—Foundations of Education . . . . .	..	3
Electives . . . . .	..	6
Total . . . . .	17	15

## FOREIGN LANGUAGE EDUCATION

The foreign language education curriculum is designed for prospective foreign language teachers in elementary and secondary schools. Students should enroll in one of the two programs according to the level for which they plan to be certificated. Secondary school teachers must take 42 semester hours in their major teaching field including the following courses which are required for certification: one year of conversation, one year of advanced grammar and composition, one year survey of literature, one year of advanced literature (100 level), and one-year courses pertaining directly to the foreign culture. Highly recommended for foreign language teachers is Foreign Language 101, Introduction to Linguistics.

Prospective FLES (Foreign Language in the Elementary School) teachers are required to have a minimum of 24 semester hours in the foreign language plus ECEEd. 143, Methods of Teaching Modern Foreign Languages in the Elementary School.

### CLASSICAL LANGUAGE—LATIN

A minor for teaching Latin requires 24 prescribed semester hours of Latin based upon two years of high school Latin or 18 prescribed semester hours of Latin plus 6 elective hours based upon four years of high school Latin. Those students with two years of high school Latin should take Latin 3, 4, 5, 51, 52, 61, 101, and 102. Those with four years of high school Latin begin with Latin 5; otherwise, the same as above with 6 hours selected from Latin 103, 104, or 105.

It is recommended that electives also be taken from Latin 70, History 153, Comparative Literature 101, English 101, and Art 9.

### ELEMENTARY FOREIGN LANGUAGE EDUCATION CURRICULUM (See Elementary Education Curriculum)

# FOREIGN LANGUAGE EDUCATION

## SECONDARY FOREIGN LANGUAGE EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
English 1—Composition and American Literature .....	3	..
English 3—Composition and World Literature .....	..	3
Social Science Requirement .....	3	3
Science or Mathematics Requirement .....	3-4	3-4
Speech 1—Public Speaking .....	3	..
Health 5—Science and Theory of Health .....	..	2
P.E. 1, 3 (men), P.E. 2, 4 (women) .....	1	1
Foreign Language 6 and 7 .....	3	3
<b>Total</b> .....	<b>16-17</b>	<b>15-16</b>
<b>SOPHOMORE YEAR</b>		
English 4—Composition and World Literature .....	3	..
History Requirements .....	3	3
Science or Mathematics .....	3-4	3-4
Fine Arts or Philosophy .....	..	3
Foreign Languages 11 and 12 .....	3	3
Electives (not in Foreign Languages) .....	3	3
<b>Total</b> .....	<b>15-16</b>	<b>15-16</b>
<b>JUNIOR YEAR</b>		
Ed. 110—Human Development and Learning .....	6	..
Foreign Language 41-42—Phonetics (recommended, but not required) .....	1	1
Foreign Language 71-72—Review Grammar and Composition .....	3	3
Foreign Language 75-76—Survey of Literature .....	3	3
Foreign Language 80-81—Advanced Conversation .....	3	3
Electives <sup>11</sup> .....	..	6
<b>Total</b> .....	<b>16</b>	<b>16</b>

<sup>11</sup> When possible, it is recommended that students elect courses related to their language area, e.g. History of France, History of Latin America, Comparative Education, etc.

## HOME ECONOMICS CURRICULUM

### SENIOR YEAR

Ed. 111—Foundations of Education .....	3	..
Sec. Ed. 140—Curriculum, Instruction and Observation....	3	..
Sec. Ed. 145—Principles and Methods of Secondary Education .....	3	..
Sec. Ed. 148—Student Teaching in the Secondary Schools ..	8	..
Elective from Ed. 147—Audio Visual Education, Ed. 150—Educational Measurement, EcEEEd. 153—The Teaching of Reading .....	3	..
Foreign Language—Advanced Literature (100 level) .....	..	6
Foreign Language 171 or 172—Civilization <sup>2</sup> .....	..	3
Elective in Foreign Language or related area (e.g. Foreign Language 100, History of France, Introduction Linguistics is recommended.) .....	..	3-6
Total .....	14-17	15-18

## HOME ECONOMICS EDUCATION

The home economics education curriculum is designed for students who are preparing to teach vocational or general home economics or to engage in any phase of home economics work which requires a knowledge of teaching methods. It includes studies of all phases of home economics and the allied sciences, with professional training for teaching these subjects. A student majoring in this curriculum may also qualify for a science minor.

The offering includes both undergraduate and graduate programs leading to the degrees of Bachelor of Science, Master of Education, and Master of Science.

## HOME ECONOMICS EDUCATION CURRICULUM

### FRESHMAN YEAR

	Semester	
	I	II
Eng. 1—Composition and American Literature .....	3	..
Social Science Requirement .....	3	..
H.E. 5—Intro. to Family Living through H.Ec. ....	2	..
Food & Nutr. 5—Food & Nutrition of Individuals and Family	3	..
AD 1—Design .....	..	3
P.E. 2 & 4 .....	1	1
G. & P. 1—American Government .....	..	3
Sp. 1—Public Speaking .....	..	3
Health 5—Science and Theory of Health .....	2	..
Electives .....	..	3-4
Math. 3—Fundamentals of Mathematics .....	4	..
Total .....	17-18	13-14

<sup>2</sup> Courses in related disciplines may be substituted with permission of Chairman of Foreign Language Department.

## HOME ECONOMICS EDUCATION CURRICULUM

### SOPHOMORE YEAR

Eng. 3, 4—Composition and World Literature .....	3	3
Hist. 21—History of U.S. to 1865 <i>or</i> Hist. 22—History of U.S. since 1865 <i>and</i> Hist. 41 <i>or</i> Hist. 42—Western Civ- ilization .....	3	3
AD 20—Costume Design .....	..	3
Tex. & Clo. 5—Textiles & Clothing in Contemporary Living .....	3	..
Clo. 10—Principles & Methods of Clothing Design .....	..	2
Chem. 11, 13 <i>or</i> 1, 3—General Chemistry .....	3-4	3-4
Foods 10—Scientific Principles of Foods .....	..	3
Fine Arts <i>or</i> Philosophy .....	3	..
<b>Total</b> .....	<b>15-16</b>	<b>17-18</b>

### JUNIOR YEAR

H.Ec.Ed. 102—Problems in Teaching Home Ec.....	3	..
Ed. 110—Human Development and Learning .....	6	..
H. Mgt. 50—Decision-making in Family Living .....	3	..
Food 150—Food Economics & Meal Management .....	..	3
H. Mgt. 160—Scientific Management in the Home .....	..	3
Nut. 20 <i>or</i> 121—Science of Nutrition .....	..	3
Clo. 11—Experimental Clothing Design .....	2	..
Econ. 37—Fundamentals of Economics .....	..	3
Zool. 1—General Zoology .....	4	..
Bot. 1—General Botany .....	..	4
<b>Total</b> .....	<b>18</b>	<b>16</b>

### SENIOR YEAR<sup>3</sup>

H.Ec.Ed. 140—Curric., Instruc., & Observation .....	3	..
Sec. Ed. 145—Principles & Methods of Secondary Ed. ....	3	..
Sec. Ed. 148—Teaching Secondary Vocational Home Economics .....	8	..
H. Mgt. 161—Resident Experience in Home Mgt. <i>or</i> H. Mgt. 165—Home Management Practicum .....	3	..
AD 2—Survey of Art History <i>or</i> T. & C. 128—Fundamentals of Home Furnishings .....	..	2-3
Microb. 1—Microbiology .....	..	4
Ed. 111—Foundations of Education <sup>14</sup> .....	..	3
Electives .....	..	6-7
<b>Total</b> .....	<b>17</b>	<b>15-17</b>

<sup>3</sup> Hec 180—Professional Seminar (Required of Seniors in the College of Home Economics).

<sup>14</sup> May be taken either semester.

## MATHEMATICS EDUCATION

A major in mathematics requires the completion of Math 22 or its equivalent and a minimum of 15 semester hours of mathematics courses at the 100 level. These 100 level courses must include Math 103, Math 146, and at least one of the geometry courses, Math 120, 121, 124, 128. The re-

## MATHEMATICS EDUCATION CURRICULUM

mainder of the courses in mathematics are to be selected with the approval of the adviser. The mathematics major must be supported by a year of physical science, Chem. 1 and 3, or Physics 10, 11, 15, 16 or Physics 20 and 21.

A typical program might be as follows:

## MATHEMATICS EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Speech 1—Public Speaking .....	3	..
Eng. 1—Composition and American Literature .....	..	3
Fine Arts and Philosophy Requirement .....	..	3
Social Science Requirement .....	3	3
Biological Science .....	4	..
Math. 18, 19—Analysis .....	3	4
Health 5—Science and Theory of Health .....	2	..
P.E. 1, 3 (men); P.E. 2, 4 (women) .....	1	1
Electives, including Foreign Language .....	..	3
<b>Total</b> .....	<b>16</b>	<b>17</b>
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature .....	3	3
History Requirement .....	3	3
Physical Science Requirement .....	4	4
Math. 20, 21—Calculus .....	4	4
Electives, including Foreign Language .....	3	3
<b>Total</b> .....	<b>17</b>	<b>17</b>
<b>JUNIOR YEAR</b>		
Math. 22—Calculus .....	4	..
Math. 103—Introduction to Abstract Algebra .....	..	3
Math. Electives, including Geometry Requirement .....	3	3
Ed. 110—Human Development and Learning .....	..	6
Electives .....	9	3
<b>Total</b> .....	<b>16</b>	<b>15</b>
<b>SENIOR YEAR</b>		
Sec. Ed. 145—Principles and Methods of Secondary Education .....	3	..
Sec. Ed. 140—Curriculum, Instruction, and Observation—Mathematics .....	3	..
Sec. Ed. 148—Student Teaching in Secondary Schools—Mathematics .....	8	..
Education Electives .....	3	..
Math. 146—Fundamental Concepts of Mathematics .....	..	3
Math. Elective .....	..	3
Ed. 111—Foundations of Education .....	..	3
Electives .....	..	6
<b>Total</b> .....	<b>17</b>	<b>15</b>

## MUSIC EDUCATION

The music education curriculum affords pre-service preparation in the specialized field of music education and leads to the degree of Bachelor of Science in education with a major in public school music. The curriculum provides training in both the choral and instrumental fields of music and is planned to meet the growing demand for special teachers and supervisors in those areas. In the junior and senior years the student may elect either the vocal option or the instrumental option.

A minor in the field may be received with 24 semester hours in music education, theory, and history; 8 semester hours in applied music; two semester hours in ensemble; Mus. Ed. 129 or 132; the student teaching divided between the student's major and minor fields. The 24 specified hours must include Music 1, 7, 8, 70, 80 or 81, 121, and 160 or 161.

MUSIC EDUCATION CURRICULUM,  
INSTRUMENTAL OPTION

	Semester	
	I	II
<b>FRESHMEN YEAR</b>		
Mus. 12, 13—Applied Music (principal instr.) .....	2	2
Mus. 1—Introduction to Music .....	3	..
Mus. 7, 8—Theory of Music .....	3	3
Mus. 23, 24—Class Piano .....	2	2
English 1—Composition and American Literature .....	..	3
Speech 4—Voice and Diction .....	3	..
Social Science Requirement .....	3	3
Math. 3 or higher course .....	..	4
<b>Total</b> .....	<b>16</b>	<b>17</b>
Mus. 6—Orchestra or 10—Band .....	1	1
Health 5—Science and Theory of Health .....	2	..
Physical Ed. 1, 3 (men) 2, 4 (women) .....	1	1
<b>SOPHOMORE YEAR</b>		
Mus. 52, 53—(principal instr.) .....	2	2
Mus. 70, 71—Advanced Theory of Music .....	4	4
Mus. 61-64—(3-4 courses) .....	2-4	2-4
English 3, 4—Composition and World Literature .....	3	3
Bot. 1—General Botany or Zool. 1—General Zoology ....	4	..
Geol. 1—Geology or Phys. 1—Elements of Physics:		
Mechanics, Heat & Sound .....	..	3
<b>Total</b> .....	<b>16</b>	<b>15</b>
Mus. 6—Orchestra or 10—Band .....	1	1
Mus. 9 (elective)—Chamber Music Ensemble .....	1	1

## MUSIC EDUCATION CURRICULUM

### JUNIOR YEAR

Mus. 112, 113 (principal instr.)	2	2
Mus. 120, 121—History of Music	3	3
Mus. 160, 161—Conducting	2	2
Mus. 65-68—(2-3 courses)	2	2-4
M.Ed. 129—Methods of Class Instrumental Instruction; and M.Ed. 132—Music in Secondary Schools	2	2
Ed. 110—Human Development and Learning	6	..
Electives	..	3
<b>Total</b>	<b>17</b>	<b>16</b>
Mus. 6—Orchestra or 10—Band	1	1
Mus. 9 (elective)—Chamber Music Ensemble	1	1

### SENIOR YEAR

Mus. 152 (principal instr.)	2	..
Mus. 21—Class Voice	2	..
Mus. 147—Orchestration	2	..
M.Ed. 163—Band Techniques and Administration	..	2
Sec. Ed. 148, ECEEd. 149—Student Teaching	..	8
Ed. 111—Foundations of Education	3	..
Sec. Ed. 145—Prins. and Methods of Sec. Ed.	3	..
History Requirement	3	3
<b>Total</b>	<b>15</b>	<b>13</b>
Mus. 6—Orchestra or 10—Band	1	1
Mus. 9 (elective)—Chamber Music Ensemble	1	1

## SECONDARY MUSIC EDUCATION CURRICULUM, VOCAL OPTION

(Semester—)

### FRESHMEN YEAR

	I	II
Mus. 12, 13—Applied Music (principal instr.)	2	2
Mus. 1—Introduction to Music	3	..
Mus. 7, 8—Theory of Music	3	3
Mus. 21—Class Voice <sup>15</sup> and Mus. 999 or Mus. 23, 24 Class Piano <sup>16</sup>	2	2
English 1—Composition and American Literature	..	3
Speech 4—Voice and Diction	3	..
Social Science Requirement	3	3
Math. 3 or higher course	..	4
<b>Total</b>	<b>16</b>	<b>17</b>
Mus. 4—Men's Glee Club or Mus. 5—Women's Chorus or Mus. 15—Chapel Choir	1	1
Health 5—Science and Theory of Health	2	..
P.E. 1, 3 (men); P.E. 2, 4 (women)	1	1

<sup>15</sup> For piano majors.

<sup>16</sup> For voice majors.

## MUSIC EDUCATION CURRICULUM

### SOPHOMORE YEAR

Mus. 52, 53 (principal instr.)	2	2
Mus. 31, 32—Advanced Class Voice	2	2
Mus. 33, 34—Advanced Class Piano	2	2
Mus. 70, 71—Advanced Theory of Music	4	4
English 3, 4—Comp. and World Lit.	3	3
Bot. 1—General Botany or Zool. 1—General Zoology	4	..
Geol. 1—Geology or Phys. 1—Elements of Physics: Mechanics, Heat and Sound	..	3

Total	17	16
-------	----	----

Mus. 4—Men's Glee Club or Mus. 5—Women's Chorus or Mus. 15—Chapel Choir	1	1
Mus. 9 (elective)—Chamber Music Ensemble	1	1

### JUNIOR YEAR

Mus. 112, 113—(principal instr.)	2	2
Mus. 80—Class Study of String Instruments, 81—Class Study of Wind Instruments	2	2
Mus. 120, 121—History of Music	3	3
Mus. 160, 161—Conducting	2	2
M.Ed. 139—Music for the Elem. Sch. Specialist, and M.Ed.— 132—Music in Sec. Schools	2	2
Ed. 110—Human Development and Learning	..	6
Electives	3	..

Total	14	17
-------	----	----

Mus. 4—Men's Glee Club or Mus. 5—Women's Chorus or Mus. 15—Chapel Choir	1	1
Mus. 9 (elective)—Chamber Music Ensemble	1	1

### SENIOR YEAR

Mus. 152—(principal instr.)	2	..
M. Ed. 173—The Vocal Music Teacher and School Organization, and M.Ed. 175—Methods and Materials in Vocal Music for Sec. Schools	2	2
Sec. Ed. 145—Principles and Methods of Secondary Ed., Ed. 111—Foundations of Ed.	3	3
Sec. Ed. 148, ECEEd. 149—Student Teaching	4	4
History requirement	3	3

Total	14	12
-------	----	----

Mus. 4—Men's Glee Club or Mus. 5—Women's Chorus or Mus. 15—Chapel Choir	1	1
Mus. 9 (elective)—Chamber Music Ensemble	1	1

## PHYSICAL EDUCATION AND HEALTH EDUCATION

This curriculum is designed to prepare students for teaching physical education in elementary and secondary schools. To obtain full particulars on course requirements, the student should refer to the catalog of the College of Physical Education, Recreation, and Health.

## SCIENCE EDUCATION CURRICULUM

### SCIENCE EDUCATION

A science major consists of 52 semester hours study in the academic sciences. Students desiring a minor other than science must complete 40 hours of academic science in addition to their minor requirements.

The following courses are required for all science education majors: Bot. 1—General Botany (4); Chem. 1, 3—General Chemistry (4, 4); Physics 10, 11—Fundamentals of Physics (4, 4); and Zool. 1—General Zoology (4). Additional courses are selected from the academic sciences, with the approval of the student's advisor, so as to provide subject matter strength (a minimum of 36 hours) in a particular science teaching area, e.g., biology, chemistry, physics, and earth sciences.

### SCIENCE EDUCATION CURRICULUM

	Semester	
	I	II
<b>FRESHMEN YEAR</b>		
Eng. 1—Composition and American Literature .....	3	..
Bot. 1—General Botany .....	4	..
Chem. 1, 3 .....	4	4
Math 18—Introductory Analysis and Math. 19—Elementary Analysis <sup>17</sup> .....	3	4
P. E. 1, 3—(men); P. E. 2, 4—(women) .....	1	1
Zool. 1—General Zoology .....	..	4
Health 5—Science and Theory of Health .....	..	2
<b>Total</b> .....	15	15
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature .....	3	3
History requirement .....	3	3
Physics 10, 11—Fundamentals of Physics or Physics 20, 21—General Physics .....	4-5	4-5
Science .....	3-4	3-4
Arts or Philosophy requirement .....	..	3
Speech 1—Public Speaking .....	3	..
<b>Total</b> .....	16-18	16-18
<b>JUNIOR YEAR</b>		
Ed. 110—Human Development and Learning .....	..	6
Science and Mathematics .....	12	9
Social Science requirements .....	3	3
<b>Total</b> .....	15	18
<b>SENIOR YEAR</b>		
Sec. Ed. 140—Curriculum, Instruction, Observation .....	..	3
Sec. Ed. 145—Principles and Methods of Secondary Education .....	..	3
Elective from Ed. 150, 147, 160, ECEEd, 153 .....	..	3
Sec. Ed. 148—Student Teaching in the Secondary Schools ..	..	8
Ed. 111—Foundations of Education .....	3	..
Science and Mathematics .....	12	..
<b>Total</b> .....	15	17

<sup>17</sup> Or Math. 10, 11 in some cases.

## SOCIAL SCIENCE EDUCATION CURRICULUM

Option I requires 54 semester hours of which at least 27 must be in history, including Hist. 21, 22, 41, 42 and 12 hours of 100-level history courses including H. 199; 27 hours of related social sciences as outlined below:

At least one course in each of the following areas: geography, sociology, government and politics, and economics. Fifteen semester hours in any two of the following areas: economics, geography, sociology, government and politics, or psychology. One-half of these courses must be on the 100 level.

### SOCIAL SCIENCE EDUCATION CURRICULUM

	Semester—	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1—Composition and Literature .....	..	3
Speech 1—Public Speaking .....	3	..
Foreign Languages .....	3	3
Mathematics requirement .....	3-4	..
Science requirement .....	..	3-4
History 21, 22—History of The United States .....	3	3
Fine Arts or Philosophy .....	..	3
Health 5—Science and Theory of Health .....	2	..
P. E. 1, 3—(men); P. E. 2, 4—(Women) .....	1	1
<b>Total</b> .....	<b>15-16</b>	<b>16-17</b>
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature .....	3	3
Hist. 41, 42—World Civilization .....	3	3
Geog. 10—General Geography .....	3	..
G. & P. 1—American Government .....	..	3
Science requirement .....	3-4	..
Foreign Languages .....	3	3
Soc. 1—Sociology of American Life .....	..	3
<b>Total</b> .....	<b>15-16</b>	<b>15</b>
<b>JUNIOR YEAR</b>		
Econ. 31—Principles of Economics or		
Econ. 37—Fundamentals of Economics .....	3	..
History electives .....	3	3
Ed. 110—Human Development and Learning .....	..	6
History elective (100-level) .....	6	3
Social Science electives .....	3	3
<b>Total</b> .....	<b>15</b>	<b>15</b>
<b>SENIOR YEAR</b>		
Ed. 111—Foundations of Education .....	3	..
History 199—Proseminar in Historical Writing .....	3	..
Social Science electives .....	6	..
Electives .....	3	..
Sec. Ed. 140—Curriculum, Instruction, Observation .....	..	3
Sec. Ed. 145—Principles and Methods of		
Secondary Education .....	..	3
Elective from Ed. 150, 147, 130, 160 .....	..	3
Sec. Ed. 148—Student Teaching in Secondary Schools .....	..	8
<b>Total</b> .....	<b>15</b>	<b>17</b>

## SPEECH EDUCATION CURRICULUM

### SPEECH EDUCATION

A major in speech requires 36 semester hours. It is the policy to build a program of study in anticipation of the needs of prospective teachers in the general field of speech. The following speech courses are required: Speech 1, 2, 4, 8, 10, 22, 23, 105, plus 15 hours of electives in Speech (12 hours of which must be 100-level courses). A teaching minor in another field is also required. Recommended minor is English.

### SPEECH EDUCATION CURRICULUM

	<i>(Semester)</i>	
<b>FRESHMAN YEAR</b>		
Speech 1—Public Speaking .....	3	..
English 1—Composition and American Literature .....	..	3
Social Science Requirements .....	3	3
Foreign Language .....	3	3
Mathematics Requirement .....	3-4	..
Speech 4—Voice and Diction .....	..	3
History Requirement .....	..	3
P. E. 1, 3 (men); P. E. 2, 4 (women) .....	1	1
Health 5—Science and Theory of Health .....	2	..
Total .....	15-16	16
<b>SOPHOMORE YEAR</b>		
English 3, 4—Composition and World Literature .....	3	3
Speech 2—Advanced Public Speaking .....	3	..
Speech 10—Group Discussion .....	2	..
Science Requirement .....	3-4	..
Health 5—Personal Health .....	..	2
Speech 8—Acting .....	..	3
Speech 22—Introduction to Radio and Television .....	..	3
Foreign Language .....	3	3
History Requirement .....	3	..
Minor Requirement .....	3	3
Total .....	18-19	17
<b>JUNIOR YEAR</b>		
Science Requirement .....	3-4	..
Ed. 110—Human Growth and Learning .....	..	6
Speech 105—Handicapped School Children .....	3	..
Speech electives .....	3	6
Minor requirements .....	3	6
Fine Arts or Philosophy (Speech 16—Introduction to the Theatre recommended) .....	3	..
Speech 23—Parliamentary Law .....	1	..
Total .....	16-17	18

## SPECIAL EDUCATION

### SENIOR YEAR

Sec. Ed. 140—Curriculum, Instruction, and Observation . . .	3	..
Sec. Ed. 145—Principles and Methods of Secondary Education . . . . .	3	..
Elective from Ed. 150, Ed. 147, or EcEEEd 153-C . . . . .	3	..
Sec. Ed. 148—Student Teaching in Secondary Schools . . . . .	8	..
Speech electives . . . . .	6	..
Minor Requirements . . . . .	9	..
Education 111—Foundations of Education . . . . .	3	..
<b>Total . . . . .</b>	<b>17</b>	<b>18</b>

NOTE: The above course levels are maximum and are based upon two conditions:  
 1) the student would need the maximum foreign language credits (12 hrs.)  
 2) the student would minor in English. Under other conditions, the course loads would be lighter.

## SPECIAL EDUCATION

An area of concentration in Special Education for undergraduate students enrolled in other teacher education programs is offered. Students may pursue a program in the area of the mentally retarded, the perceptually impaired or gifted at the undergraduate level.

A minimum of 20 hours in special education is required for completion of this concentration.

Sp. Ed. 170. Introduction to Special Education . . . . .	(3)
Sp. Ed. 171. Characteristics of Exceptional Children (appropriate section) . . . . .	(3)
Sp. Ed. 172. Education of Exceptional Children (appropriate section) . . . . .	(3)
Sp. Ed. 173. Curriculum of Exceptional Children (appropriate section) . . . . .	(3)
Ed. 149. <sup>11</sup> Student Teaching . . . . .	(8)

<sup>11</sup> One half of the student teaching assignment is in a Special program; the other in a regular assignment.

Students interested in graduate programs (Masters, Advanced Graduate Specialists and Doctoral) in Special Education are requested to consult the Graduate School catalog for appropriate information re: programs and advisers; and to consult with the office of the Coordinator of Special Education.

# Course Offerings

THE UNIVERSITY RESERVES THE RIGHT TO WITHDRAW OR DISCONTINUE any course for which an insufficient number of students has registered to warrant giving the course. In such an event, no fee will be charged for transfer to another course.

Courses are designated by numbers as follows:

1 to 99: courses for undergraduates.

100 to 199: courses for advanced undergraduates and graduates. (Not all courses numbered 100 to 199 may be taken for graduate credit.)

200 to 299: courses for graduates only.

300 to 399: courses for doctoral candidates and advanced graduate students.

A course with a single number extends through one semester. A course with a double number extends through two semesters. The number of credit hours is shown by the arabic numeral in parentheses after the title of the course.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his program. Students obtain these schedules when they register.

## EDUCATION

### *Courses Primarily for Freshmen and Sophomores*

#### ED. 6 OBSERVATION OF TEACHING. (1)

Twenty hours of directed observation. Reports, conferences, and criticisms.  
(Staff.)

#### ED. 90. DEVELOPMENT AND LEARNING. (3)

A study of the principles of learning and their application to school situations. Designed to meet the usual teacher-certification requirement for educational psychology.  
(Staff.)

### *For Advanced Undergraduates and Graduates*

#### ED. 100. HISTORY OF EDUCATION IN WESTERN CIVILIZATION. (3)

Educational institutions through the ancient, medieval, and early modern periods in the western civilization, as seen against a background of socio-economic development.  
(Lindsay.)

#### ED. 102. HISTORY OF EDUCATION IN THE UNITED STATES. (3)

A study of the origins and development of the chief features of the present system of education in the United States.  
(Wiggin.)

**ED. 107. PHILOSOPHY OF EDUCATION. (2-3)**

A study of the great educational philosophers and systems of thought affecting the development of modern education. (Agre, Noll.)

**ED. 108. LOGIC OF TEACHING. (3)**

An analysis of the structure of basic subject matters in the curriculum and of the standard logical moves in teaching. (Agre.)

**ED. 110. HUMAN DEVELOPMENT AND LEARNING. (6)**

Open only to students enrolled in approved teacher education curricula. Studies scientific facts that describe growth, development, and learning, and the implications of these for the teacher and the school. A study of an individual child and a classroom participation experience are integral parts of the course and require a one-half day per week assignment in a public school as a teacher aide. Students are scheduled for field assignments in an elementary or high school according to the curriculum they are in. Each group is under the supervision of a faculty member with whom it meets every second week in a seminar session. (Staff.)

**ED. 111. FOUNDATIONS OF EDUCATION. (3)**

Prerequisites, Ed. 110, completion of at least 90 hours, and approval for admission to teacher education. Historical, social, cultural and philosophical foundations of American education. Considers education as a profession, and the organizational structure, operation and function of modern school systems. Comparative education and contemporary issues are included.

(Agre, Finkelstein, Lindsay, Noll.)

**ED. 147. AUDIO-VISUAL EDUCATION. (3)**

First semester and summer session. Laboratory fee, \$1.00. Sensory impressions in their relation to learning projection apparatus, its cost and operation; slides, filmstrips, and films, physical principles underlying projection; auditory aids to instruction; field trips; pictures, models, and graphic materials; integration of sensory aids with organized instruction. Recommended for all education students. (Maley, Schramm, Wedberg.)

**ED. 150. EDUCATIONAL MEASUREMENT. (3)**

First and second semesters; summer session. Constructing and interpreting measures of achievement. (Staff.)

**ED. 151. STATISTICAL METHODS IN EDUCATION. (3)**

Designed as a first course in statistics for students in education. Emphasis is upon educational applications of descriptive statistics, including measures of central tendency, variability, and association. (Staff.)

**ED. 155. LABORATORY PRACTICES IN READING. (2-4)**

Prerequisite, ECEEd. 153 or Ed. 157. A laboratory course in which each student has one or more pupils for analysis and instruction. At least one class meeting per week to diagnose individual cases and to plan instruction.

(Hall, Sullivan, Wilson.)

**ED. 157. CORRECTIVE-REMEDIAL READING INSTRUCTION. (3)**

Prerequisite, ECEEd. 153 or equivalent. For teachers, supervisors, and administrators who wish to identify and assist pupils with reading difficulties. Concerned with diagnostic techniques, instructional materials, and teaching procedures useful in the regular classroom. (Hall, Sullivan, Wilson.)

## EDUCATION

### ED. 160. EDUCATIONAL SOCIOLOGY. (3)

Deals with data of the social sciences which are germane to the work of teachers. Implications of democratic ideology for educational endeavor, educational tasks imposed by changes in population and technological trends, the welfare status of pupils, the socio-economic attitudes of individuals who control the schools, and other elements of community background. (Grambs.)

### ED. 161. INTRODUCTION TO COUNSELING AND PUPIL SERVICES. (3)

Presents guidance principles and procedures, and examines the functions of counselors, psychologists in schools, school social workers, and other pupil service workers. (Staff.)

### ED. 162. MENTAL HYGIENE IN THE CLASSROOM. (3)

The practical application of the principles of mental hygiene to classroom problems. (Greenberg.)

### ED. 182. INTRODUCTION TO REHABILITATION COUNSELING. (3)

Introductory course for majors in rehabilitation counseling, social work, psychology or education who desire to work professionally with physically or emotionally handicapped persons. (Ehrle, Lawrence.)

### ED. 185. PUPIL TRANSPORTATION. (3)

Includes consideration of the organization and administration of state, county, and district pupil transportation service with emphasis on safety and economy. The planning of bus routes; the selection and training of bus drivers, and maintenance mechanics; the specification of school buses; and procurement procedures are included. (Staff.)

### ED. 187. FIELD EXPERIENCE IN EDUCATION. (1-4)

- |                               |                                     |
|-------------------------------|-------------------------------------|
| a. Adult Education            | f. Industrial Arts Education        |
| b. Counseling                 | g. Student Personnel Administration |
| c. Curriculum and Instruction | h. Supervision                      |
| d. Educational Administration | i. Vocational--Industrial Education |
| e. Higher Education           |                                     |

Prerequisites, at least six semester hours in education at the University of Maryland plus such other prerequisites as may be set by the major area in which the experience is to be taken. Planned field experience may be provided for selected graduate students who have had teaching experience and whose application for such field experience has been approved by the Education faculty. Field experience is offered in a given area to both major and non-major students.

Note: The total number of credits which a student may earn in Ed. 187, Ed. 224, and Ed. 287 is limited to a maximum of twenty (20) semester hours. (Staff.)

### ED. 188. SPECIAL PROBLEMS IN EDUCATION. (1-3)

Prerequisites, consent of instructor. Available only to mature students who have definite plans for individual study of approved problems. *Course cards must have the title of the problem and the name of the faculty member who has approved it.* (Staff.)

**ED. 189. WORKSHOPS, CLINICS, AND INSTITUTES. (1-6)**

The maximum number of credits that may be earned under this course symbol toward any degree is six semester hours; the symbol may be used two or more times until six semester hours have been reached. The following type of educational enterprise may be scheduled under this course heading: workshops conducted by the College of Education (or developed cooperatively with other colleges and universities) and not otherwise covered in the present course listing; clinical experiences in pupil-testing centers, reading clinics, speech therapy laboratories, and special education centers; institutes developed around specific topics or problems and intended for designated groups such as school superintendents, principals, and supervisors. (Staff.)

*For Graduates***ED. 202.-THE JUNIOR COLLEGE. (3)**

The philosophy and development of the junior college in the United States with emphasis on curriculum and administrative controls. Special attention is devoted to the importance, need, place, and development of the technical-terminal or semi-professional curricula. (Kelsey.)

**ED. 203. PROBLEMS IN HIGHER EDUCATION. (3)**

A study of present problems in higher education. (Kelsey.)

**ED. 205. COMPARATIVE EDUCATION. (3)**

A study of historical changes in ways of looking at national school systems, and of problems in assessing their effectiveness. (Lindsay, Wiggin.)

**ED. 206. SEMINAR IN COMPARATIVE EDUCATION. (2)**

(Lindsay, Wiggin.)

**ED. 207. SEMINAR IN HISTORY AND PHILOSOPHY OF EDUCATION. (2)**

(Noll, Wiggin.)

**ED. 208. ANALYSIS OF EDUCATIONAL CONCEPTS. (3)**

Application of techniques of conceptual analysis to selected concepts in education. Mental health, adjustment, creativity, and understanding are among the concepts considered. (Agre.)

**ED. 209. ADULT EDUCATION. (3)**

A study of adult education in the United States, with attention to adult abilities and intelligence, programs of adult education, and a rationale for adult education. (Staff.)

**ED. 210. THE ORGANIZATION AND ADMINISTRATION OF PUBLIC EDUCATION. (3)**

The basic course in school administration. Deals with the organization and administration of school systems—at the local, state, and federal levels; and with the administrative relationships involved. (Dudley, Newell, van Zwoll.)

**ED. 211. THE ORGANIZATION AND ADMINISTRATION OF SECONDARY SCHOOLS. (3)**

The work of the secondary school principal. Includes topics such as personnel problems, school-community relationships, student activities, schedule making, and internal financial accounting. (J. P. Anderson.)

## EDUCATION

### ED. 212. SCHOOL FINANCE AND BUSINESS ADMINISTRATION. (3)

An introduction to principles and practices in the administration of the public school finance activity. Sources of tax revenue, the budget, and the function of finance in the educational program are considered. (van Zwoll.)

### ED. 214. SCHOOL PLANT PLANNING. (2-3)

An orientation course in which the planning of school buildings is developed as educational designing with reference to problems of site, building facilities, and equipment. (van Zwoll.)

### ED. 216. PUBLIC SCHOOL SUPERVISION. (3)

The nature and functions of supervision; various supervisory techniques and procedures; human relationship factors; and personal qualities for supervision. (Dudley, J. P. Anderson, Neville.)

### ED. 217. ADMINISTRATION AND SUPERVISION IN ELEMENTARY SCHOOLS. (3)

Problems in administering elementary schools and improving instruction. (Dudley.)

### ED. 218. SCHOOL SURVEYS. (2-6)

Prerequisite, consent of instructor. Includes study of school surveys with emphasis on problems of school organization and administration, finance and school plant planning. Field work in school surveys is required. (Newell.)

### ED. 219. SEMINAR IN EDUCATIONAL ADMINISTRATION AND SUPERVISION. (2-4)

Prerequisite, at least four hours in educational administration and supervision or consent of instructor. A student may register for two hours and may take the seminar a second time for an additional two hours. (Staff.)

### ED. 221. ADVANCED SCHOOL PLANT PLANNING. (2)

Ed. 214 is a prerequisite to this course. However, students with necessary background may be admitted without completion of Ed. 214. This is an advanced course in school plant planning problems. Emphasis is given to analysis of the educational program and planning of physical facilities to accommodate that program. (van Zwoll.)

### ED. 223. PRACTICUM IN PERSONNEL RELATIONSHIPS. (2-6)

Prerequisite, consent of instructor. Enrollment limited. Designed to help teachers, school administrators, and other school staff members to learn to function more effectively in developing educational policy in group situations. Each student in the course is required to be working concurrently in the field with a group of school staff members or citizens on actual school problems. (Newell.)

### ED. 224. APPRENTICESHIP IN EDUCATION. (6-9)

- |                               |                                     |
|-------------------------------|-------------------------------------|
| a. Counseling                 | e. Supervision                      |
| b. Curriculum and Instruction | f. Student Personnel Administration |
| c. Educational Administration | g. Vocational Industrial Education  |
| d. Industrial Arts Education  |                                     |

Apprenticeships in the major area of study are available to selected students whose application for an apprenticeship has been approved by the Education

faculty. Each apprentice is assigned to work for at least a semester full-time or the equivalent with an appropriate staff member of a cooperating school, school system or educational institution or agency. The sponsor of the apprentice maintains a close working relationship with the apprentice and the other persons involved. Prerequisites, teaching experience, a master's degree in education, and at least six semester hours in education at the University of Maryland. (Staff.)

Note: The total number of credits which a student may earn in Ed. 187, Ed. 224, and Ed. 287 is limited to a maximum of twenty (20) semester hours.

**ED. 225. SCHOOL PUBLIC RELATIONS. (3)**

A study of the interrelationship between the community and the school. Public opinion, propaganda, and the ways in which various specified agents and agencies within the school have a part in the school public relations program are explored. (van Zwoll.)

**ED. 226. CHILD ACCOUNTING. (2)**

An inquiry into the record keeping activities of the school system, including an examination of the marking system. (van Zwoll.)

**ED. 227. PUBLIC SCHOOL PERSONNEL ADMINISTRATION. (3)**

A comparison of practices with principles governing the satisfaction of school personnel needs, including a study of tenure, salary schedules, supervision, rewards, and other benefits. (van Zwoll.)

**ED. 228. INTRODUCTION TO STUDENT PERSONNEL. (2)**

Prerequisite, consent of instructor. (Same as Psych. 228). A systematic analysis of research and theoretical literature on a variety of major problems in the organization and administration of student personnel services in higher education. Included will be discussion of such topics as the student personnel philosophy in education, counseling services, discipline, housing student activities, financial aid, health, remedial services, etc. (Rishel, Marx.)

**ED. 234. THE SCHOOL CURRICULUM. (2-3)**

A foundations course embracing the curriculum as a whole from early childhood through adolescence, including a review of historical developments, an analysis of conditions affecting curriculum change, an examination of issues in curriculum making, and a consideration of current trends in curriculum design. (Hovet.)

**ED. 235. PRINCIPLES OF CURRICULUM DEVELOPMENT. (3)**

Curriculum planning, improvement, and evaluation in the schools; principles for the selection and organization of the content and learning experiences; ways of working in classroom and school on curriculum improvement. (Neville, V. Anderson.)

**ED. 237. CURRICULUM THEORY AND RESEARCH. (2)**

The school curriculum considered within the totality of factors affecting pupil behavior patterns, an analysis of research contributing to the development of curriculum theory, a study curriculum theory as basic to improved curriculum design, the function of theory in guiding research, and the construction of theory through the utilization of concepts from the behavior research disciplines. (Hovet.)

## EDUCATION

### ED. 241. PROBLEMS IN THE TEACHING OF READING. (3)

A. Elementary Schools

B. Secondary Schools

Implications of current theory and the results of research for the teaching of reading. Attention is given to all areas of development reading instruction, with special emphasis on persistent problems. (Hall, Sullivan, Wilson.)

### ED. 242. COORDINATION IN WORK-EXPERIENCE PROGRAMS. (2)

Surveys and evaluates the qualifications and duties of a teacher-coordinator in a work-experience program. Deals particularly with evolving patterns in city and county schools in Maryland, and is designed to help teacher-coordinators, guidance counselors, and others in the supervisory and administrative personnel concerned with functioning relationships of part-time cooperative education in a comprehensive educational program. (Merrill.)

### ED. 245. INTRODUCTION TO RESEARCH. (2)

Intensive reading, analysis, and interpretations of research, applications to teaching fields; the writing of abstracts, research reports, and seminar papers. (Staff.)

### ED. 248. SEMINAR IN INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. (2)

(See Ind. Ed. 248)

(Maley.)

### ED. 249. PERSONALITY THEORIES IN EDUCATION. (3)

Prerequisite, consent of instructor. Examination of constructs and research relating to major personality theories with emphasis on their significance for educators working with the behavior of individuals in school settings. (Greenberg.)

### ED. 250. CASES IN PUPIL APPRAISAL. (3)

Prerequisite, Ed. 262. Collecting and interpreting non-standardized pupil appraisal data; synthesis of all types of data through case study procedures. (Ray, Rhoads.)

### ED. 251. INTERMEDIATE STATISTICS IN EDUCATION. (3)

Prerequisite, Education 151 or equivalent. A study of the basic statistical techniques used for graduate research in education, including tests of significance and sampling techniques. Necessary arithmetic skills are developed as part of the course. (Staff.)

### ED. 253. OCCUPATIONAL CHOICE THEORY AND INFORMATION. (3)

Prerequisite, Ed. 161. Research and theory related to occupational and educational decisions; school programs of related information and other activities in occupational decisions. (Rhoads, Byrne.)

### ED. 254. ORGANIZATION AND ADMINISTRATION OF PUPIL SERVICES. (2)

Prerequisite, Ed. 261 or permission of instructor. Instilling the guidance point of view and implementing guidance practices. (Greenberg.)

**ED. 255, 256. ADVANCED LABORATORY EXPERIENCES IN READING INSTRUCTION. (3, 3)**

The first semester of the course deals with diagnostic techniques. Each participant will assist in diagnosing reading disabilities and in recommending instructional programs for individual pupils. The second semester deals with instruction of pupils with reading disabilities. Each participant will plan and execute a program of instruction for an individual or a small group, applying findings of the preliminary diagnosis. (Hall, Sullivan, Wilson.)

**ED. 257. DIAGNOSIS AND REMEDIATION OF READING DISABILITIES. (3)**

Prerequisites, ECEEd 153 and Ed. 157. For those who wish to become corrective and remedial reading specialists. Concerned with clinical techniques, instructional materials, and remedial procedures useful to the reading specialist in (1) diagnosing serious reading difficulties and (2) planning programs of individual and small-group instruction. The work includes the writing of diagnostic and progress reports. (Hall, Sullivan, Wilson.)

**ED. 259. COUNSELING IN ELEMENTARY SCHOOLS. (3)**

Prerequisite, Ed. 250, or consent of instructor. Counseling theory and practices as related to children. Emphasis will be placed on an awareness of the child's total behavior as well as on specific methods of communicating with the child through techniques of play interviews, observations, and the use of non-parametric data. (Greenberg.)

**ED. 260. SCHOOL COUNSELING: THEORETICAL FOUNDATIONS AND PRACTICE. (3)**

Prerequisites, Ed. 161, 250, 253. Exploration of learning theories as applied to counseling in school, and practices which stem from such theories. (Staff.)

**ED. 261. PRACTICUM IN COUNSELING. (2-6)**

Prerequisites, Ed. 260 and permission of instructor. Sequence of supervised counseling experiences of increasing complexity. Limited to eight applicants in advance. Two hour class plus laboratory. (Staff.)

**ED. 262. MEASUREMENT IN PUPIL APPRAISAL. (3)**

Prerequisite, Ed. 150. Study of group tests typically employed in school testing programs; discussion of evidence relating to the measurement of abilities. (Staff.)

**ED. 263, 264. MODIFICATION OF HUMAN BEHAVIOR: LABORATORY AND PRACTICUM (3, 3)**

First and second semesters. Application of methods relevant to behavior change in counseling and psychotherapy. Individual supervision and group consultation. Laboratory fee \$6 per semester. (Staff.)

**ED. 265. THEORY OF MEASUREMENT. (2)**

Prerequisites, Ed. 150 and Ed. 151. Treats such topics as theory and techniques used in various scaling methods, test analysis, predictive accuracy of scores, and equivalence of scores. For students desiring more advanced treatment of problems. (Giblette.)

**ED. 269. COUNSELING AND PUPIL SERVICES SEMINAR. (2)**

Enrollment by permission of instructor. (Marx.)

## EDUCATION

### ED. 271. ADVANCED STATISTICS IN EDUCATION. (3)

Prerequisites, Ed. 251 or equivalent. Primarily for the education student desiring more advanced work in statistical methodology. Survey of major types of statistical design in educational research; application of multivariate statistical techniques to educational problems. (Stunkard, Dayton.)

### ED. 275, 276. ADVANCED PROBLEMS IN ART EDUCATION. (3, 3)

These courses are centered about problems of teaching art in the elementary and secondary schools in terms of the philosophy of art education today, techniques and processes in the visual arts, and creative opportunities in the visual arts and in art education. The student also will have the opportunity to do special work centered about his problems in art education. (Staff.)

### ED. 279. SEMINAR IN ADULT EDUCATION. (2)

(Staff.)

### ED. 280. RESEARCH METHODS AND MATERIALS. (2)

Research methodology for case studies, surveys, and experiments; measurement and statistical techniques; design, form, and style for theses and research reports. Primarily for advanced students and doctoral candidates. (Stunkard.)

### ED. 281. SOURCE MATERIALS IN EDUCATION. (2)

Bibliography development through a study of source materials in education, special fields in education, and for seminar papers and theses. (Wiggin.)

### ED. 283. PSYCHO-SOCIAL ASPECTS OF DISABILITY. (3)

Prerequisite, Ed. 182 or consent of instructor. This course is part of the core curriculum for rehabilitation counselors. It is designed to develop an understanding of the nature and importance of the personal and psycho-social aspects of adult disability. (Ehrle.)

### ED. 284, 285. MEDICAL ASPECTS OF DISABILITY I, II. (3, 3)

Prerequisite, Ed. 182 or consent of instructor. Part of the core curriculum for rehabilitation counselors. It is designed to develop an understanding of the prognosis and complications of disease processes and disorders and a knowledge of treatment measures so that realistic vocational rehabilitation goals may be developed. (Staff.)

### ED. 287. INTERNSHIP IN EDUCATION. (12-16)

- |                               |                                    |
|-------------------------------|------------------------------------|
| a. Curriculum and Instruction | e. Student Personnel Services      |
| b. Educational Administration | f. Supervision                     |
| c. Industrial Arts Education  | g. Vocational-Industrial Education |
| d. Pupil Personnel Services   |                                    |

Internships in the major area of study are available to selected students who have teaching experience. The following groups of students are eligible: (a) any student who has been advanced to candidacy for the doctor's degree and (b) any student who receives special approval by the Education faculty for an internship, provided that prior to taking an internship, such student shall have completed at least sixty semester hours of graduate work, including at least six semester hours in education at the University of Maryland. Each intern is assigned to work on a full-time basis for at least a semester with an appropriate staff member in a cooperating school system, or educational institution

or agency. The internship must be taken in a school situation different from the one where the student is regularly employed. The intern's sponsor maintains a close working relationship with the intern and the other persons involved.

Note: The total number of credits which a student may earn in Ed. 187, Ed. 224, and Ed. 287 is limited to a maximum of twenty (20) semester hours.

(Staff.)

#### ED. 288. SPECIAL PROBLEMS IN EDUCATION. (1-6)

First and second semesters and summer session. Master's, advanced graduate specialist, or doctoral candidates who desire to pursue special research problems under the direction of their advisers may register for credit under this number. *Course-card must have the title of the problem and the name of the faculty member under whom the work will be done.*

(Staff.)

#### ED. 290. DOCTORAL SEMINAR. (1-3)

Prerequisite, passing the preliminary examination for a doctor's degree in education or recommendation of a doctoral adviser. Analysis of doctoral projects and theses, and of other ongoing research projects. A doctoral candidate may participate in the Seminar during as many University sessions as he desires, but may earn no more than three semester hours of credit in the Seminar. An Ed.D. candidate may earn in total no more than nine semester hours, and a Ph.D. candidate, no more than eighteen semester hours, in the Seminar and in Ed. 399.

(Dayton, Hovet, Stunkard.)

#### ED. 302. CURRICULUM IN HIGHER EDUCATION. (3)

An analysis of research in curriculum and of conditions affecting curriculum change, with examination of issues in curriculum making based upon the history of higher education curriculum development.

(Kelsey.)

#### ED. 303. ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION. (3)

Organization and administration of higher education at the local, state, and federal levels; and an analysis of administrative relationships and functions and their effects on curriculum and instruction.

(Kelsey, Wiggins.)

#### ED. 304. STUDENT PERSONNEL AND THE COLLEGE STUDENT. (2)

A demographic study of the characteristics of college students; as well as a study of their aspirations, values, and purposes.

(Bott.)

#### ED. 305. COLLEGE TEACHING. (3)

Various methods of college instruction analyzed in relation to the curriculum and psychological basis. These would include the case study method, the demonstration method, the lecture method, the recitation method, teaching machines, teaching by television, and other teaching aids.

(Kelsey and Staff.)

#### ED. 309. SEMINAR IN PROBLEMS OF HIGHER EDUCATION. (2)

(Kelsey.)

#### ED. 310. SEMINAR IN STUDENT PERSONNEL. (2-6)

An intensive study of the various student personnel functions. A means to integrate the knowledges from various fields as they relate to student personnel administration.

(Marx, Rishel.)

## CHILDHOOD EDUCATION

### ED. 399. RESEARCH—THESIS. (CREDITS VARIABLE)

Registration required to the extent of 6 hours for master's thesis; 6-9 hours for a doctoral project; and 12-18 hours for a doctoral dissertation. (Staff.)

## EARLY CHILDHOOD ELEMENTARY EDUCATION

### *Courses Primarily for Freshmen and Sophomores*

#### ECEED. 52. INTRODUCTION TO CHILDREN'S LITERATURE. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2)

Prerequisites, Eng. 1, 3 and 4. A survey of literary materials for children and young people. Appropriate books for preschool, elementary, and junior high school pupils are considered, including picture-story, fiction, folk-lore, poetry, and informational books. Integrating literature with the curriculum, and methods of using books with children in the classroom. Aids and criteria for selection.  
(E. Anderson, D. Brown, Pfau.)

### *For Advanced Undergraduates*

#### ECEED. 105. SCIENCE IN THE ELEMENTARY SCHOOL. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2-3)

Laboratory fee, \$2.00. Designed to help teachers acquire general science understandings and to develop teaching materials for practical use in classrooms. Includes experiments, demonstrations, constructions, observations, field trips, and use of audio-visual materials. The emphasis is on content and method related to science units in common use in elementary schools. Formerly Sci. Ed. 105.

(Blough, Stant, Williams.)

#### ECEED. 115. ACTIVITIES AND MATERIALS IN EARLY CHILDHOOD EDUCATION. (3)

First and second semesters. Prerequisites, H. D. Ed. 110 (or concurrent enrollment). Laboratory fee, \$5.00. Storytelling, selection of books, the use, preparation, and presentation of such raw materials as clay, paints (easel and finger), blocks, wood, and scrap materials.

(Stant.)

#### ECEED. 116. MUSIC IN EARLY CHILDHOOD EDUCATION. (3)

First and second semesters. Prerequisite, Music 16 or equivalent. Creative experiences in songs and rhythms, correlation of music and everyday teaching with the abilities and development of each level; study of songs and materials; observation and teaching experience with each age level.

(L. Brown.)

#### ECEED. 121. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2-3)

Teaching of spelling, handwriting, oral and written expression, and creative expression. Special emphasis given to skills having real significance to pupils.

(Collins, Edgemon, Leeper, Pfau, Seidman, Zachary.)

#### ECEED. 122. SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2-3)

Consideration given to curriculum, organization and methods of teaching, evaluation of newer materials, and utilization of environmental resources.

(Duffey, Herman, O'Neill, Weaver.)

**ECEED. 123. THE CHILD AND THE CURRICULUM. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2-3)**

Relationship of the elementary school curriculum to child growth and development. Recent trends in curriculum organization; the effect of environment on learning, readiness to learn; and adapting curriculum content and methods to maturity levels of children. (Edgemon, Seidman.)

**ECEED. 124. MATHEMATICS IN THE ELEMENTARY SCHOOL. A.—EARLY CHILDHOOD; B.—ELEMENTARY. (2-3)**

Emphasis on materials and procedures which help pupils sense arithmetical meanings and relationships. Helps teachers gain a better understanding of the number system and arithmetical processes. (Ashlock, Schindler.)

**ECEED. 125. ART IN THE ELEMENTARY SCHOOL. (2-3)**

Concerned with art methods and materials for elementary schools. Includes laboratory experiences with materials appropriate for elementary schools. (Lembach, Longley.)

**ECEED. 127. TEACHING IN THE ELEMENTARY SCHOOL. A.—NURSERY SCHOOL AND KINDERGARTEN; B.—ELEMENTARY SCHOOL. (2-6)**

An overview of elementary school teaching designed for individuals without specific preparation for elementary school teaching or for individuals without recent teaching experience. (Staff.)

**ECEED. 140. CURRICULUM AND INSTRUCTION. A.—COOPERATIVE NURSERY SCHOOL; B.—EARLY CHILDHOOD; C.—ELEMENTARY. (3)**

Philosophy of early childhood education, observation of the developmental needs at various age levels, with emphasis upon the activities, materials, and methods by which educational objectives are attained. (Leeper, Stant.)

**ECEED. 143. FOREIGN LANGUAGE METHODS IN THE ELEMENTARY SCHOOL. (3)**

Graduate credit allowed by special arrangement and adviser's approval. Registration limited and based upon approval of adviser. Methods and techniques for developmental approach to the teaching of modern foreign languages in elementary schools. Use of realia development of oral-aural skills and understanding of young children in language development are stressed. (Rentz.)

**ECEED. 149. STUDENT TEACHING IN ELEMENTARY SCHOOLS. A.—NURSERY SCHOOL (4-8); B.—KINDERGARTEN (4-8); C.—ELEMENTARY (4-16)**

Fee, \$24 for students who do not pay the regular instructional materials fee. A grade point average of 2.30, a doctor's certificate indicating freedom from communicable diseases, and approval of the instructor required. Undergraduate credit only. No other courses may be taken during a full semester of student teaching. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 16 credits full time for one semester is devoted to this work. For experienced teachers the time and credit may be reduced. May be taken for 4 hours credit in combination with a comparable student teaching assignment at the secondary level, by music education and physical education majors with the permission of their advisers. (Staff.)

## HUMAN DEVELOPMENT EDUCATION

### ECEED. 152. LITERATURE FOR CHILDREN AND YOUNG PEOPLE, ADVANCED. (3)

Prerequisite, Ed. 52, or approval of instructor. Development of literary materials for children and young people. Timeless and ageless books, and outstanding examples of contemporary publishing. Evaluation of the contributions of individual authors and illustrators and children's book awards. Study and practice in story-telling, and reading guidance in the classroom and library.  
(E. Anderson, D. Brown, Pfau)

### ECEED. 153. THE TEACHING OF READING. A.—EARLY CHILDHOOD; B.—ELEMENTARY; C.—SECONDARY. (2-3)

Concerned with the fundamentals of development reading instruction, including reading readiness, use of experience records, procedures in using basal readers, the improvement of comprehension, teaching reading in all areas of the curriculum, uses of children's literature, the program in word analysis, and procedures for determining individual needs.

(Hall, Herman, Sullivan, Wilson, Zachary.)

### *For Graduates*

### ECEED. 200. SEMINAR IN ELEMENTARY EDUCATION. (2)

Primarily for individuals who wish to write seminar papers. Prerequisite: at least 12 hours of graduate work in education.  
(Staff.)

### ECEED. 205. PROBLEMS IN TEACHING SCIENCE IN ELEMENTARY SCHOOLS. (2)

An opportunity to pursue special problems in curriculum making, course of study development, or other science teaching problems. Class members may work on problems related directly to their own school situation.  
(Blough, Williams.)

### ECEED. 210. CURRICULUM PLANNING IN NURSERY-KINDERGARTEN EDUCATION. (3)

An examination of significant new developments in curriculum theory and practice.  
(Leeper.)

### ECEED. 211. THE YOUNG CHILD IN THE COMMUNITY. (3)

Planned observation, related research, and analysis of the experiences of young children in such community centers as foster homes, orphanages, day care centers, Sunday schools, etc. One-half day a week observation required. (Hymes.)

### ECCEED. 212. THE YOUNG CHILD IN SCHOOL. (3)

An examination of significant theory and research on the characteristics of young children which have special implications for teaching children in nursery-kindergarten groups.  
(Leeper.)

### ECEED. 213. TEACHER-PARENT RELATIONSHIPS. (3)

A study of the methods and materials, trends, and problems in establishing close home-school relationships.  
(Hymes.)

### ECEED. 214. INTELLECTUAL EXPERIENCES OF THE NURSERY-KINDERGARTEN CHILD. (2)

A critical examination of materials, methods and programs in such areas as reading, literature, science, mathematics, the social studies.  
(Staff.)

## HUMAN DEVELOPMENT EDUCATION

### ECEED. 215. CREATIVE EXPERIENCES OF THE NURSERY-KINDERGARTEN CHILD. (2)

A critical examination of materials, methods and programs in such areas as art, music, dance and rhythms, language, etc. (Staff.)

### ECCED. 221. PROBLEMS OF TEACHING LANGUAGE ARTS IN ELEMENTARY SCHOOLS. (2)

Implications of current theory and results of research for the language arts in the elementary schools. (Edgemon, Pfau, Seidman, Zachary.)

### ECEED. 222. PROBLEMS OF TEACHING SOCIAL STUDIES IN ELEMENTARY SCHOOLS. (2)

Application to the social studies program of selected theory and research in the social sciences, emphasizing patterns of behavior, environmental influences, and critical thinking. (Duffey, Herman, O'Neill, Weaver.)

### ECEED. 224. PROBLEMS OF TEACHING MATHEMATICS IN ELEMENTARY SCHOOLS. (2)

Implications of theory and results of research for the teaching of arithmetic in the elementary schools. (Ashlock, Schindler.)

## HUMAN DEVELOPMENT EDUCATION

The Institute for Child Study offers a series of courses on human development and approaches to the direct study of children. Certain prerequisites are set up within the course sequences but these prerequisites are modified by the student's previous experience in direct study of children.

Undergraduate courses are designed both for prospective teachers and in-service teachers (H. D. Ed. 102, 103, 104; H. D. Ed. 112-13, 114-15, 116-17). The graduate offering contains two series. H. D. Ed. 200, 201, 202, 203 provide a basic core of four seminars for students majoring in the field, and also provide electives (beginning with H. D. Ed. 200—Introduction) for any graduate student interested in an overview of the field. The other seminars (H. D. Ed. 204 and above) are designed for emphasis in depth on the various areas of major processes and forces that shape the development and behavior of human beings, and are intended primarily for advanced graduate students. Along with most of the graduate seminars, H. D. Ed. 250 provides for concurrent application of scientific knowledge to the direct study of children as individuals and in groups.

### *For Advanced Undergraduates and Graduates*

### H. D. ED. 102, 103, 104. CHILD DEVELOPMENT LABORATORY I, II, AND III. (2, 2, 2)

These courses involve the direct study of children throughout the school year. Each participant gathers a wide body of information about an individual, presents the accumulating data from time to time to the study group for criticism and group analysis and writes an interpretation of the dynamics underlying the

## HUMAN DEVELOPMENT EDUCATION

child's learning behavior and development. Provides opportunity for teachers in service to earn credit for participation in their own local child study group.  
(Staff.)

### H. D. ED. 105. ADOLESCENT DEVELOPMENT. (3)

A study of the interplay of physical, cultural and self forces as they influence behavior, development, learning, and adjustment during adolescence. Includes observation and case study. *This course cannot be used to meet the psychological foundations requirements for teacher certification.*  
(Mershon.)

### H. D. ED. 106. A STUDY OF HUMAN BEHAVIOR. (3)

This course is planned for and limited to students who are not enrolled in the College of Education; and it does not satisfy the requirements of the professional Teacher Education Programs. The course is designed to introduce students to the scientific principles (physical, social and psychological) which describe human behavior, development and adjustment at all maturity levels and to use these principles in the study of individual children and youth. Each student will observe, record, and analyze the behavior of an individual throughout the semester and must have one half-day a week for this purpose.  
(Hamby.)

### H. D. ED. 107. GROWTH AND DEVELOPMENT IN EARLY CHILDHOOD. (3)

First and second semesters. Developmental growth of the child from the pre-natal period through the early childhood years, with implications for home and school practice. For students in other colleges of the University.  
(Staff.)

### H. D. ED. 112, 114, 116. SCIENTIFIC CONCEPTS IN HUMAN DEVELOPMENT I, II, III. (3, 3, 3)

Summer session.  
(Staff.)

### H. D. ED. 113, 115, 117. LABORATORY IN BEHAVIOR ANALYSIS I, II, III. (3, 3, 3)

Summer session.  
(Staff.)

### H. D. ED. 120, 121, 122. STUDY OF HUMAN DEVELOPMENT AND LEARNING IN SCHOOL SETTINGS I, II, III. (2, 2, 2)

A sequence of courses which enables in-service teachers and administrators to carry on advanced study of human development and learning principles in the continuous study and evaluation of several different phases of the school program over an extended period of time.  
(Staff.)

### H. D. ED. 145. GUIDANCE OF YOUNG CHILDREN. (3)

Development of an appreciation and understanding of young children from different home and community backgrounds; study of individual and group problems.  
(Hymes.)

## *For Graduates*

### H. D. ED. 200. INTRODUCTION TO HUMAN DEVELOPMENT AND CHILD STUDY. (3)

Offers a general overview of the scientific principles which describe human development and behavior and makes use of these principles in the study of individual children. Each student will observe and record the behavior of an individual child throughout the semester and must have one half-day a week for

## HUMAN DEVELOPMENT EDUCATION

this purpose. It is basic to further work in child study and serves as a prerequisite for advanced courses where the student has not had field work or at least six weeks of workshop experience in child study. When offered during the summer intensive laboratory work with case records may be substituted for the study of an individual child. (Kyle, Kurtz, Thompson.)

### H. D. ED. 201. BIOLOGICAL BASES OF BEHAVIOR. (3)

H. D. Ed. 200 or its equivalent must be taken before H. D. Ed. 201 or concurrently. Emphasizes that understanding human life, growth, and behavior depends on understanding the ways in which the body is able to capture, control, and expand energy. Application throughout is made to human body processes and implications for understanding and working with people. (Chapin.)

### H. D. ED. 202. SOCIAL BASES OF BEHAVIOR. (3)

H. D. Ed. 200 or its equivalent must be taken before H. D. Ed. 202 or concurrently. Limitations learned by an individual as he grows up. These are considered in relation to the patterns of feeling and behaving which emerge as the result of growing up in one's social group. (Klevan, Matteson.)

### H. D. ED. 203. INTEGRATIVE BASES OF BEHAVIOR. (3)

H. D. Ed. 200 or its equivalent, H. D. Ed. 201 and H. D. Ed. 202 are prerequisite. Analyzes the organized and integrated patterns of feeling, thinking and behaving which emerge from the interaction of basic biological drives and potentials with one's unique experience growing up in a social group. (Bowie.)

### H. D. ED. 204, 205. PHYSICAL PROCESSES IN HUMAN DEVELOPMENT. (3, 3)

Prerequisite, H. D. Ed. 200 or its equivalent. Describes in some detail the major organic processes of: conception, biological inheritance; differentiation and growth of the body; capture, transportation and use of energy, perception of the environment; coordination and integration of function; adaptation to unusual demands and to frustration; normal individual variation in each of the above processes. (Chapin.)

### H. D. ED. 206, 207. SOCIALIZATION PROCESSES IN HUMAN DEVELOPMENT I, II. (3, 3)

Prerequisite, H. D. Ed. 200 or its equivalent. Analyzes the processes by which human beings internalize the culture of the society in which they live. The major sub-cultures in the United States, their training procedures, and their characteristic human expressions in folk-knowledge, habits, attitudes, values, life-goals, and adjustment patterns are analyzed. Other cultures are examined to highlight the American way of life and to reveal its strengths and weaknesses. (Mershon, Kurtz.)

### H. D. ED. 208, 209. SELF PROCESSES IN HUMAN DEVELOPMENT I AND II. (3, 3)

Prerequisite, H. D. Ed. 200 or its equivalent. Analyzes the effects of the various physical and growth processes, affectional relationships, socialization processes, and peer group roles and status on the integration, development, adjustment, and realization of the individual self. This analysis includes consideration of the nature of intelligence and of the learning process; the develop-

## HUMAN DEVELOPMENT EDUCATION

ment of skills, concepts, generalizations, symbolizations, reasoning and imagination, attitudes, values, goals and purposes; and the condition, relationships and experiences that are essential to full human development. The more common adjustment problems experienced in our society at various maturity levels, and the adjustment mechanisms used to meet them are studied.

(Goering, Mershon.)

### H. D. ED. 210. AFFECTIONAL RELATIONSHIPS AND PROCESSES IN HUMAN DEVELOPMENT. (3)

H. D. Ed. 200 or its equivalent must be taken before or concurrently. Describes the normal development, expression and influence of love in infancy, childhood, adolescence and adulthood. It deals with the influence of parent-child relationship involving normal acceptance, neglect, rejection, inconsistency, and over-protection upon health, learning, emotional behavior and personality adjustment and development.

(Hatfield.)

### H. D. ED. 211. PEER-CULTURE AND GROUP PROCESSES IN HUMAN DEVELOPMENT. (3)

H. D. Ed. 200 or its equivalent must be taken before or concurrently. Analyzes the processes of group formation, role-taking and status-winning. It describes the emergence of the "peer-culture" during childhood and the evolution of the child society at different maturity levels to adulthood. It analyzes the developmental tasks and adjustment problems associated with winning, belonging and playing roles in the peer group.

(Hatfield.)

### H. D. ED. 212, 214, 216. ADVANCED SCIENTIFIC CONCEPTS IN HUMAN DEVELOPMENT I, II, III. (3, 3, 3)

Summer session.

(Staff.)

### H. D. ED. 213, 215, 217. ADVANCED LABORATORY IN BEHAVIOR ANALYSIS I, II, III. (3, 3, 3)

Summer session.

(Staff.)

### H. D. ED. 221. LEARNING THEORY AND THE EDUCATIVE PROCESS I. (3)

Prerequisite: Ed. 110. Provides a systematic review of the major theories of learning and their impact on education. Considers factors that influence learning.

(Perkins, Lawson, Milhollan.)

### H. D. ED. 222. LEARNING THEORY AND THE EDUCATIVE PROCESS II. (3)

Provides an exploration in depth of current theoretical and research developments in the field of human learning, especially as related to educational processes. Considers factors that influence learning.

(Perkins.)

### H. D. ED. 230, 231. FIELD PROGRAM IN CHILD STUDY I AND II. (2-6)

Prerequisite, consent of instructor. Offers apprenticeship training preparing properly qualified persons to become staff members in human development workshops, consultants to child study field programs and coordinators of municipal or regional child study programs for teachers or parents. Extensive field experience is provided. In general this training is open only to persons who have passed their preliminary examinations for the doctorate with a major in human development or psychology.

(Kurtz, Thompson.)

## INDUSTRIAL EDUCATION

### H. D. Ed. 250a, 250b, 250c. DIRECT STUDY OF CHILDREN. (1, 1, 1)

May not be taken concurrently with H. D. Ed. 102, 103, 104, or 200. Provides the opportunity to observe and record the behavior of an individual child in a nearby school. These records will be used in conjunction with the advanced courses in human development and this course will be taken concurrently with such courses. Teachers active in their jobs while taking advanced courses in human development may use records from their own classrooms for this course. A minimum of one year of direct observation of human behavior is required of all human development students at the master's level. This requirement may be satisfied by this course. (Staff.)

### H. D. Ed. 260. SYNTHESIS OF HUMAN DEVELOPMENT CONCEPTS. (3)

Prerequisites, H. D. Ed. 204, 206 and 208. A seminar wherein advanced students work toward a personal synthesis of their own concepts in human growth and development. Emphasis is placed on seeing the dynamic interrelations between all processes in the behavior and development of an individual.

(Morgan.)

### H. D. Ed. 270. SEMINARS IN SPECIAL TOPICS IN HUMAN DEVELOPMENT. (2-6)

Prerequisite, consent of the instructor. An opportunity for advanced students to focus in depth on topics of special interest growing out of their basic courses in human development.

(Morgan.)

## INDUSTRIAL EDUCATION

### IND. ED. 1. MECHANICAL DRAWING. (2)

Two laboratory periods a week. Laboratory fee, \$5.00. This course constitutes an introduction to orthographic multi-view and isometric projection. Emphasis is placed upon the visualization of an object when it is represented by a multi-view drawing and upon the making of multi-view drawings. The course carries through auxiliary views, sectional views, dimensioning, conventional representation and single stroke letters.

(Kicklighter.)

### IND. ED. 2. WOODWORKING I. (3)

Six hours of laboratory per week. Laboratory fee, \$7.50. The course is designed to give the student an orientation into the woodworking industry with regard to materials, products, and processes while providing for skill development in the care and use of hand and power tools.

(Schramm.)

### IND. ED. 9. INDUSTRIAL ARTS IN THE ELEMENTARY SCHOOL I. (2)

Two laboratory periods a week. Laboratory fee, \$5.00. A course for pre-service and in-service elementary school teachers covering construction activities in a variety of media suitable for classroom use. The work is organized on the unit basis so that the construction aspect is supplemented by reading and other investigative procedures.

(Gettle.)

### IND. ED. 10. INDUSTRIAL ARTS IN THE ELEMENTARY SCHOOL II. (2)

Prerequisite, Ind. Ed. 9. This is a continuation of Ind. Ed. 9. Two laboratory periods a week. Laboratory fee, \$5.00. It provides the teacher with opportunities to develop further competence in construction activities. Some of the basic phenomena of industry are studied, particularly those which apply to the manufacture of common products, housing, transportation and communication.

(Gettle.)

## INDUSTRIAL EDUCATION

### IND. ED. 12. SHOP CALCULATIONS. (3)

Shop Calculations is designed to develop an understanding and working knowledge of the mathematical concepts related to the various aspects of industrial education. The course includes phases of algebra, geometry, trigonometry, and general mathematics as applied to shop and drawing activities. (Smart.)

### IND. ED. 21. MECHANICAL DRAWING. (2)

Two laboratory periods a week. Prerequisite, Ind. Ed. 1. Laboratory fee, \$5.00. A course dealing with working drawings, machine design, pattern layouts, tracing and reproduction. Detail drawings followed by assemblies are presented. (Kicklighter.)

### IND. ED. 22. WOODWORKING II. (3)

Six hours of laboratory per week. Prerequisite, Ind. Ed. 2, for industrial arts teacher education majors. Laboratory fee, \$7.50. The course is designed to give the student a comprehensive knowledge of machine production with emphasis on safety, industrial processes, and maintenance. (Schramm.)

### IND. ED. 23. ARC AND GAS WELDING. (1)

One laboratory period a week. Laboratory fee, \$5.00. A course designed to develop a functional knowledge of the principles and use of electric and acetylene welding. Practical work is carried on in the construction of various projects using welded joints. Instruction is given in the use and care of equipment, types of welded joints, methods of welding, importance of welding processes in industry, safety consideration, etc. (Harrison.)

### IND. ED. 24. SHEET METAL WORK. (2)

Two laboratory periods a week. Laboratory fee, \$5.00. Articles are made from metal in its sheet form and involve the operations of cutting, shaping, soldering, riveting, wiring, folding, seaming, beading, burning, etc. The student is required to develop his own patterns inclusive of parallel line development, radial line development, and triangulation. (Crosby.)

### IND. ED. 26. GENERAL METAL WORK. (3)

Three two-hour laboratory periods a week. Laboratory fee, \$7.50. This course provides experiences in constructing items from aluminum, brass, copper, pewter, and steel. The processes included are designing, lay out, heat treating, forming, surface decorating, fastening, and assembling. The course also includes a study of the aluminum, copper, and steel industries in terms of their basic manufacturing processes. (Staff.)

### IND. ED. 28. ELECTRICITY-ELECTRONICS I. (3)

Six hours per week. Laboratory fee, \$7.50. An introductory course to electricity-electronics in general, dealing with electrical circuits and wiring, the measurement of electrical energy, the theory of motors and generators, and an introduction to vacuum tubes, transistors and power supplies. (Guy.)

### IND. ED. 31. MECHANICAL DRAWING. (2)

Two laboratory periods a week. Prerequisites, Ind. Ed. 1 and 31. Laboratory fee, \$5.00. A course dealing with the topics enumerated in Ind. Ed. 21 but on a more advanced basis. The reading of prints representative of a variety of industries is a part of this course. (Luetkemeyer.)

**IND. ED. 33. AUTOMOTIVES I. (3)**

Three two-hour laboratory periods a week. Laboratory fee, \$7.50. Automotives I is a study of the fundamentals of internal combustion engines as applied to transportation. A study of basic materials and methods used in the automotive industry is included. Shop practices are built around the maintenance and minor repair of automobiles and smaller motor driven apparatus.

(Merrill.)

**IND. ED. 34. GRAPHIC ARTS I. (3)**

Three two-hour laboratory periods a week. Laboratory fee, \$7.50. An introductory course involving experiences in letterpress and offset printing practices. This course includes typographical design, hand composition, proof reading, stock preparation, offset plate making, imposition, lock-up, stock preparation, presswork, linoleum, block cutting, paper marbelizing, and bookbinding.

(Tierney.)

**IND. ED. 41. ARCHITECTURAL DRAWING. (2)**

Two laboratory periods a week. Prerequisite, Ind. Ed. 1 or equivalent. Laboratory fee, \$5.00. Practical experience is provided in the design and planning of houses and other buildings. Working drawings, specifications, and blue-prints are featured.

(Crosby, Kicklighter.)

**IND. ED. 42. WOODWORKING III. (3)**

Six hours of laboratory per week. Prerequisite, Ind. Ed. 22. Laboratory fee, \$7.50. The course is designed to give the student a comprehensive knowledge of contemporary woodworking technology with emphasis on mass production techniques, industrial research, and materials testing.

(Schramm.)

**IND. ED. 43. AUTOMOTIVES II. (3)**

Three two-hour laboratory periods a week. Prerequisite, Ind. Ed. 33. Laboratory fee, \$7.50. This is an advanced course in automobile construction and maintenance covering the engine, fuel system, ignition system, chassis, and power train. Shop practices are built around the major repair and adjustment of the above groups.

(Merrill.)

**IND. ED. 44. GRAPHIC ARTS II. (3)**

Three two-hour laboratory periods a week. Prerequisite, Ind. Ed. 34. Laboratory fee, \$7.50. An advanced course designed to provide further experiences to letterpress and offset printing and to introduce other reproduction processes. Silk screen printing, dry print etching, mimeograph reproduction, and rubber stamp making are the new processes introduced in this course.

(Tierney.)

**IND. ED. 48. ELECTRICITY-ELECTRONICS II. (3)**

Six hours per week. Laboratory fee, \$7.50. Prerequisite, I. Ed. 28 or equivalent. An intermediate course designed to provide more extensive knowledge in electricity-electronics including the principles of the transmission and reception of radio waves, the applications of transistors and other semiconductors and an introduction to industrial electronics.

(Harrison, Guy.)

**IND. ED. 50. METHODS OF TEACHING. (3)**

(Offered at University College Centers.) For vocational and occupational teachers of shop work and related subjects. The identification and analysis of

## INDUSTRIAL EDUCATION

factors essential to helping others learn; types of teaching situations and techniques; measuring results and grading student progress in shop and related technical subjects. (Maley.)

### IND. ED. 66. ART METAL WORK. (2)

Two laboratory periods a week. Prerequisite, Ind. Ed. 26, or equivalent. Laboratory fee, \$5.00. Advanced practicum. It includes methods of bowl raising and bowl ornamenting. (Crosby.)

### IND. ED. 69. MACHINE SHOP PRACTICE I. (3)

Two three-hour laboratory periods a week. Prerequisite, Ind. Ed. 1, or equivalent. Laboratory fee, \$7.50. Bench work, turning, planing, milling, and drilling. Related technical information. (Mertens.)

### IND. ED. 84. ORGANIZED AND SUPERVISED WORK EXPERIENCES. (3)

See description under Industrial Education 124. (Staff.)

### IND. ED. 89. MACHINE SHOP PRACTICE II. (2)

Two laboratory periods a week. Prerequisite, Ind. Ed. 69 or equivalent. Laboratory fee, \$5.00. Advanced shop practicum in thread cutting grinding, boring, reaming, and gear cutting. Work-production methods are employed. (Mertens.)

### IND. ED. 101. OPERATIONAL DRAWING. (2)

Two laboratory periods a week. Prerequisite, Ind. Ed. 1, or equivalent. Laboratory fee, \$5.00. A comprehensive course designed to give students practice in the modern drafting methods of industry. (Luettkemeyer.)

### IND. ED. 105. GENERAL SHOP. (2)

Laboratory fee, \$5.00. Designed to meet needs in organizing and administering a secondary school general shop. Students are rotated through skill and knowledge developing activities in a variety of shop areas. (Gettle.)

### IND. ED. 108. ELECTRICITY-ELECTRONICS III. (3)

Six hours per week. Laboratory fee, \$7.50. Prerequisite, Ind. Ed. 28 or equivalent. An advanced course designed to provide more extensive knowledge in electricity or electronics including the advanced theory and applications of semi-conductors and the principles of the storage and transmission of electronically coded information. (Harrison.)

### IND. ED. 109. EXPERIMENTAL ELECTRICITY AND ELECTRONICS—

A, B, C, D. (2, 2, 2, 2)

(Offered in Baltimore.) (Guy.)

### IND. ED. 110. FOUNDRY. (1)

One laboratory period a week. Laboratory fee, \$5.00. Bench and floor molding and elementary core making. Theory and principles covering foundry materials, tools and appliances. (Maley.)

### IND. ED. 111. LABORATORY PRACTICUM IN INDUSTRIAL ARTS EDUCATION. (3)

Three two-hour laboratory periods a week. Prerequisite, eighteen semester hours of shopwork and drawing. Laboratory fee, \$7.50. A course devoted to

## INDUSTRIAL EDUCATION

the development of instructional materials and the refinement of instructional methods pertinent to the teaching of industrial arts at the secondary school level. (Maley.)

### IND. ED. 115. RESEARCH AND EXPERIMENTATION IN INDUSTRIAL ARTS. (3)

This is a laboratory-seminar course designed to develop persons capable of planning, directing, and evaluating effective research and experimentation procedures with the materials, products, and processes of industry. (Maley.)

### IND. ED. 121. INDUSTRIAL ARTS IN SPECIAL EDUCATION. (3)

Four hours laboratory per week, one hour lecture. Prerequisite, Sp. Ed. 170 and 171 or consent of instructor. Laboratory fee, \$5.00. This course provides experiences of a technical and theoretical nature in industrial processes applicable for classroom use. Emphasis is placed on individual research in the specific area of one major interest in special education. (Staff.)

### IND. ED. 124. ORGANIZED AND SUPERVISED WORK EXPERIENCES.

(3 credits for each internship period total: 6 credits). This is a work experience sequence planned for students enrolled in the curriculum, "Education for Industry." The purpose is to provide the students with opportunities for first-hand experiences with business and industry. The student is responsible for obtaining his own employment with the coordinator advising him in regard to the job opportunities which have optimum learning value. The nature of the work experience desired is outlined at the outset of employment and the evaluations made by the student and the coordinator are based upon the planned experiences. The time basis for each internship period is 6 forty-hour weeks or 240 work hours. Any one period of internship must be served through continuous employment in a single establishment. Two internships are required. The two internships may be served with the same business or industry. The completion for credit of any period of internship requires the employer's recommendation in terms of satisfactory work and work attitudes. More complete details are found in the handbook prepared for the student of this curriculum. (Merrill.)

### IND. ED. 125, 126. INDUSTRIAL TRAINING IN INDUSTRY I, II, (3, 3)

The first course is designed to provide an overview of the function of industrial training, type of programs, organization, development and evaluation. The second course (prerequisite the first course) is designed to study specific training programs in a variety of industries, plant program visitation, training program development, and analyses of industrial training research. (Merrill.)

### IND. ED. 140 (ED. 140). CURRICULUM, INSTRUCTION, AND OBSERVATION. (3)

Major functions and specific contributions of industrial art education; its relation to the general objectives of the junior and senior high schools, selection and organization of subject matter in terms of modern practices and needs; methods of instruction; expected outcomes; measuring results; professional standards. Twenty periods of observation. (Luetkemeyer.)

### IND. ED. 143. INDUSTRIAL SAFETY EDUCATION I. (2)

This course deals briefly with the history and development of effective safety

## INDUSTRIAL EDUCATION

programs in modern industry and treats causes, effects, and values of industrial safety education inclusive of fire prevention and hazard controls.

(Korb, Crosby.)

### IND. ED. 144. INDUSTRIAL SAFETY EDUCATION II. (2)

In this course exemplary safety practices are studied through conference discussions, group demonstration, and organized plant visits to selected industrial situations. Methods of fire precautions and safety practices are emphasized. Evaluative criteria in safety programs are formulated.

(Korb, Crosby.)

### IND. ED. 148. STUDENT TEACHING IN THE SECONDARY SCHOOLS. (2-8)

First and second semesters. See Ed. 148 for additional requirements. Fee, \$24 for students who do not pay the regular instructional materials fee.

(Tierney.)

### IND. ED. 150. TRAINING AIDS DEVELOPMENT. (3)

Study of the aids in common use as to their source and application. Special emphasis is placed on principles to be observed in making aids useful to shop teachers. Actual construction and application of such devices will be required.

(Maley.)

### IND. ED. 157. TESTS AND MEASUREMENTS. (3)

Prerequisite, Ed. 150 or consent of instructor. The construction of objective tests for occupational and vocational subjects.

(Luetkemeyer.)

### IND. ED. 160. ESSENTIALS OF DESIGN. (2)

Two laboratory periods a week. Prerequisites, Ind. Ed. 1 and basic shop work. Laboratory fee, \$5.00. A study of the basic principles of design and practice in their application to the construction of shop projects.

(Luetkemeyer.)

### IND. ED. 161. PRINCIPLES OF VOCATIONAL GUIDANCE. (2)

This course identifies and applies the underlying principles of guidance to the problems of educational and vocational adjustment of students.

(Staff.)

### IND. ED. 164. LABORATORY ORGANIZATION AND MANAGEMENT. (3)

This course covers the basic elements of organizing and managing an industrial education program including the selection of equipment and the arrangement of the shop.

(Crosby, Schramm.)

### IND. ED. 165. MODERN INDUSTRY. (3)

This course provides an overview of manufacturing industry in the American social, economic, and culture pattern. Representative basic industries are studied from the viewpoints of personnel and management organization, industrial relations, production procedures, distribution of products, and the like.

(Harrison.)

### IND. ED. 166. EDUCATIONAL FOUNDATIONS OF INDUSTRIAL ARTS. (2)

A study of the factors which place industrial arts education in any well-rounded program of general education.

(Luetkemeyer.)

### IND. ED. 167. PROBLEMS IN OCCUPATIONAL EDUCATION. (3)

The purpose of this course is to secure, assemble, organize, and interpret data relative to the scope, character, and effectiveness of occupational education.

(Staff.)

## INDUSTRIAL EDUCATION

IND. ED. 169. OCCUPATIONAL ANALYSIS AND COURSE CONSTRUCTION. (3)  
Provides a working knowledge of occupational and job analysis and applies the techniques in building and reorganizing courses of study for effective use in vocational and occupational schools. (Staff.)

IND. ED. 171. HISTORY AND PRINCIPLES OF VOCATIONAL EDUCATION. (3)  
An overview of the development of vocational education from primitive times to the present with special emphasis given to the vocational education movement within the American program of public education. (Luetkemeyer.)

IND. ED. 175. RECENT TECHNOLOGICAL DEVELOPMENTS IN PRODUCTS AND PROCESSES. (3)

This course is designed to give the student an understanding of recent technological developments as they pertain to the products and processes of industry. The nature of the newer products and processes is studied as well as their effect upon modern industry and/or society. (Crosby.)

### *For Graduates*

IND. ED. 207. PHILOSOPHY OF INDUSTRIAL ARTS EDUCATION. (3)

This course is intended to assist the student in his development of a point of view in regard to industrial arts and its relationship with the total educational program. He should thereby, have a "yardstick" for appraising current procedures and proposals and an articulateness for his own professional area. (Harrison.)

IND. ED. 214. SCHOOL SHOP PLANNING AND EQUIPMENT SELECTION. (3)

This course deals with principles involved in planning a school shop and provides opportunities for applying these principles. Facilities required in the operation of a satisfactory shop program are catalogued and appraised. (Tierney.)

IND. ED. 216. SUPERVISION OF INDUSTRIAL ARTS. (2)

(Tierney.)

IND. ED. 220. ORGANIZATION, ADMINISTRATION AND SUPERVISION OF VOCATIONAL EDUCATION. (2)

This course surveys objectively organization, administration, supervision, curricular spread and view point, and the present status of vocational education. (Staff.)

IND. ED. 240. RESEARCH IN INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. (2)

This is a course offered by arrangement for persons who are conducting research in the areas of industrial arts and vocational education. (Staff.)

IND. ED. 241. CONTENT AND METHOD OF INDUSTRIAL ARTS. (3)

Various methods and procedures used in curriculum development are examined and those suited to the field of Industrial Arts education are applied. Methods of and devices for industrial arts instruction are studied and practiced. (Maley.)

IND. ED. 248. SEMINAR IN INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. (2)

(Staff.)

## LIBRARY SCIENCE EDUCATION

### IND. ED. 250. TEACHER EDUCATION IN INDUSTRIAL ARTS. (3)

This course is intended for the Industrial Arts teacher educator at the college level. It deals with the function and historical development of Industrial Arts Teacher education. Other areas of content include administration program and program development, physical facilities and requirements, staff organization and relationships, college-secondary school relationships, philosophy and evaluation. (Harrison.)

## LIBRARY SCIENCE EDUCATION

### *For Advanced Undergraduates and Graduates*

#### L. S. ED. 120. INTRODUCTION TO LIBRARIANSHIP. (3)

An overview of the library profession. Development of public, academic, special, and school library services. History of books and libraries. The library as a social institution. The impact of communication media on society. Philosophy of librarianship. Professional standards, organizations and publications. (E. Anderson.)

#### L. S. ED. 122. BASIC REFERENCE AND INFORMATION SOURCES. (3)

Evaluation, selection, and utilization of information sources, in subject areas, including encyclopedias, dictionaries, periodical indexes, atlases, yearbooks. Study of bibliographical methods and form. (D. Brown, James.)

#### L. S. ED. 124. BOOK SELECTION AND EVALUATION FOR CHILDREN AND YOUTH. (3)

Principles of book selection for school libraries and children's collections. Book selection aids and reviewing media. Influence of the community and curriculum on selection. Evaluation of published editions, translations, series. (D. Brown.)

#### L. S. ED. 126. CATALOGING AND CLASSIFICATION OF LIBRARY MATERIALS. (3)

Principles and practice in the organization of library materials. Dewey Decimal Classification, rules for the dictionary catalog, Sears subject headings. Treatment of non-book materials. Cataloging aids and tools. (James.)

#### L. S. ED. 128. SCHOOL LIBRARY ADMINISTRATION AND SERVICE. (3)

Acquisition, circulation, utilization and maintenance of library materials. Organization of effective school library programs. School library quarters and equipment. Publicity and exhibits. Evaluation of library services. (E. Anderson, D. Brown.)

#### L. S. ED. 130. LIBRARY MATERIALS FOR CHILDREN. (3)

Reading interests of children. Advanced study of children's literature. Survey and selection of informational materials in subject fields including: books, periodicals, films, filmstrips, records, pictures, pamphlet materials. (D. Brown, James.)

#### L. S. ED. 132. LIBRARY MATERIALS FOR YOUTH. (3)

Reading interests of young people. Literature for adolescents. Selection of informational materials in subject fields including: books, periodicals, films, filmstrips, records, pictures, pamphlet materials. (E. Anderson.)

## SECONDARY EDUCATION

## GENERAL AND ACADEMIC EDUCATION

## SEC. ED. 130. THE JUNIOR HIGH SCHOOL. (2-3)

A general overview of the junior high school. Purposes, functions and characteristics of this school unit; a study of its population, organization, program of studies, methods, staff, and other topics, together with their implications for prospective teachers. (Grambs.)

SEC. ED. 133.<sup>19</sup> METHODS OF TEACHING SOCIAL STUDIES IN SECONDARY SCHOOLS. (2-3)

Designed to give practical training in the everyday teaching situations. Use of various lesson techniques, audio and visual aids, reference materials, and testing programs and the adaption of teaching methods to individual and group differences. Present tendencies and aims of instruction in the social studies. (Risinger, Fitch, Farrell.)

## SEC. ED. 134. MATERIALS AND PROCEDURES FOR THE SECONDARY SCHOOL CORE CURRICULUM. (3)

Laboratory fee, \$1.00. This course is designed to bring practical suggestions to teachers who are in charge of core classes in junior and senior high schools. Materials and teaching procedures for specific units of work are stressed. (Grambs.)

SEC. ED. 137.<sup>20</sup> METHODS OF TEACHING MATHEMATICS IN SECONDARY SCHOOLS. (3)

Considers the methods and procedures for presenting secondary mathematics in a meaningful way. Special attention will be given to the new experimental materials which have been prepared for grades 7-12 and the techniques needed to teach these courses. (Garstens, Henkelman.)

SEC. ED. 138.<sup>20</sup> METHODS OF TEACHING SCIENCE IN SECONDARY SCHOOLS. (3)

Laboratory fee, \$2.00. Considers such topics as the objectives, selection, organization, and presentation of subject matter, appropriate classroom methods and procedures, instructional materials and evaluation of learning experiences in the areas of science. (Lockard.)

## SEC. ED. 139. SPEECH METHODS AND RESOURCES IN SECONDARY SCHOOLS. (3)

Practical suggestions for developing curricular and extra-curricular speech programs. Planning units and courses of study, current trends, and aims of speech education, use of printed and audio-visual materials, evaluating of performance, directed speech activities, and the teaching of listening. (Frank.)

## SEC. ED. 140. CURRICULUM, INSTRUCTION, AND OBSERVATION. (3)

First and/or second semesters. Offered in separate sections for the various subject matter areas namely, English, social studies, foreign language, science,

<sup>19</sup> This course is designed for teachers in service and is not open to regular undergraduate students.

## ACADEMIC EDUCATION

mathematics, art education, business education, home economics education, industrial education, music education, physical education, and speech education. Registration cards must include the subject-matter area as well as the name and number of the course. The objectives, selection and organization of subject matter, appropriate methods, lesson plans, textbooks, and other instructional materials, measurement, and other topics pertinent to the particular subject matter area are treated. Twenty periods of observation. Students must reserve all day each Wednesday for observation in public schools. (Staff.)

### SEC. ED. 141.<sup>20</sup> METHODS OF TEACHING ENGLISH IN SECONDARY SCHOOLS. (3)

Content and method in teaching the English language arts. (Bryan, Rodgers.)

### SEC. ED. 142. TEACHING THE AUDIO-LINGUAL SKILLS IN FOREIGN LANGUAGES. (3)

Graduate credit allowed by special arrangement and adviser's approval. Designed for high school teachers. Methods in making and using tape recordings, using electronic laboratories, developing oral-aural skills and direct approach to language teaching are emphasized. (Kelly, Beusch.)

### SEC. ED. 145. PRINCIPLES AND METHODS OF SECONDARY EDUCATION. (3)

First and second semesters; summer session. This course is concerned with the principles and methods of teaching in junior and senior high schools. Instructional problems common to all of the subject fields are considered in relation to the needs and interests of youth, the urgent social problems of today, and the central values to which our society is committed.

(Adkins, Funavo, Pickett, Van Ness.)

### SEC. ED. 148. STUDENT TEACHING IN SECONDARY SCHOOLS. (2-8)

First and second semesters. Fee, \$24 for students who do not pay the regular instructional materials fee. In order to be admitted to a course in student teaching, a student must have an overall grade point average of 2.30, a doctor's certificate indicating that the applicant is free of communicable diseases, and the consent of the instructor to the appropriate area. He must have been previously enrolled at the University of Maryland for at least one semester. Undergraduate credit only. Application forms for this course must be submitted to the appropriate adviser by the middle of the semester preceding the one in which an assignment is desired. Students who register for this course serve as apprentice teachers in the schools to which they are assigned. For 8 credits, full time for one-half of the semester is devoted to this work. For experienced teachers and students in physical education and music education who are planning to split student teaching assignment in elementary and secondary schools, the time and credit may be modified. (Staff.)

## *For Graduates*

### SEC. ED. 239. SEMINAR IN SECONDARY EDUCATION. (2)

(Risinger, Adkins, McClure.)

---

<sup>20</sup> These courses are designed for teachers in service and are not open to regular undergraduates.

## BUSINESS EDUCATION

### SEC. ED. 240. TRENDS IN SECONDARY SCHOOL CURRICULUM. (3)

A. English B. Foreign Languages. C. Mathematics. D. Science. E. Social Studies. F. Speech. G. General.

Recent developments in educational thinking and practice which have affected the curriculum in one of the specified areas. (Staff.)

### SEC. ED. 247. SEMINAR IN SCIENCE EDUCATION. (2)

An opportunity to pursue special problems in curriculum making, course of study development, or other science teaching problems. Class members may work on problems related directly to their own school situations.

(Lockard.)

### SEC. ED. 268. SEMINAR IN EDUCATIONAL SOCIOLOGY. (2)

(Grambs, Risinger.)

## BUSINESS EDUCATION

### *For Advanced Undergraduates and Graduates*

#### B. ED. 100. TECHNIQUES OF TEACHING OFFICE SKILLS. (3)

First semester. An examination and evaluation of the aims, methods, and course contents of each of the office skill subjects offered in the high school curriculum.

(Patrick.)

#### B. ED. 101. PROBLEMS IN TEACHING OFFICE SKILLS. (3)

Problems in development of occupational competency, achievement tests, standards of achievement, instructional materials, transcription, and the integration of office skills.

(Patrick.)

#### B. ED. 102. METHODS AND MATERIALS IN TEACHING BOOKKEEPING, AND RELATED SUBJECTS. (3)

Important problems and procedures in the mastery of bookkeeping and related office knowledge and the skills including a consideration of materials and teaching procedures.

(Patrick.)

#### B. ED. 104. BASIC BUSINESS EDUCATION IN THE SECONDARY SCHOOLS. (3)

Includes consideration of course objectives; subject matter selection; and methods of organizing and presenting business principles, knowledge, and practices.

(Patrick.)

### *For Graduates*

#### B. ED. 200. ADMINISTRATION AND SUPERVISION OF BUSINESS EDUCATION. (3)

Major emphasis on departmental organization and its role in the school program, curriculum, equipment, budget-making, supervision, guidance, placement and follow-up, school-community relationships, qualifications and selection of teaching staff, visual aids and in-service programs for teacher development. For administrators, supervisors, and teachers.

(Patrick.)

#### B. ED. 205. SEMINAR IN BUSINESS EDUCATION. (2)

The study and evaluation of the literature and research in business education.

(Patrick.)

## MUSIC EDUCATION

- B. ED. 255. PRINCIPLES AND PROBLEMS OF BUSINESS EDUCATION. (2-3)  
Principles, objectives, and practices in business education; occupational foundations; current attitudes of business, labor and school leaders; general business education relation to consumer business education and to education in general. (Patrick.)

B. ED. 256. CURRICULUM DEVELOPMENT IN BUSINESS EDUCATION. (2-3)

This course is especially designed for graduate students interested in devoting the summer session to a concentrated study of curriculum planning in business education. Emphasis will be placed on the philosophy and objectives of the business education program, and on curriculum research and organization of appropriate course content. (Staff.)

## HOME ECONOMICS EDUCATION

### *For Advanced Undergraduates and Graduates*

H. E. ED. 102. PROBLEMS IN TEACHING HOME ECONOMICS. (3)

First and second semesters. Prerequisite, H. E. Ed. 140. A study of the managerial aspects of teaching and administering a home-making program; the physical environment, organization, and sequence of instructional units, resource materials, evaluation, home projects. (Spencer, Lemmon.)

H. E. ED. 120. EVALUATION OF HOME ECONOMICS. (3)

The meaning and function of evaluation in education; the development of a plan for evaluating a homemaking program with emphasis upon types of evaluation devices, their construction, and use. (Spencer, Lemmon.)

H. E. ED. 140. CURRICULUM, INSTRUCTION, AND OBSERVATION. (3)

The place and function of home economics education in the secondary school curriculum. Philosophy of education for home and family living; characteristics of adolescence, construction of source units, lesson plans, and evaluation devices; directed observation in junior and senior high school home economics departments. (Spencer.)

H. E. ED. 200. SEMINAR IN HOME ECONOMICS EDUCATION. (2)

(Spencer, Lemmon.)

H. E. ED. 202. TRENDS IN THE TEACHING AND SUPERVISION OF HOME ECONOMICS. (2-4)

Study of home economics programs and practices in light of current educational trends. Interpretation and analysis of democratic teaching procedures, outcomes of instruction, and supervisory practices. (Spencer, Lemmon.)

## MUSIC EDUCATION

### *For Advanced Undergraduates and Graduates*

MUS. ED. 125. CREATIVE ACTIVITIES IN THE ELEMENTARY SCHOOL. (2)

Prerequisite, Music 16 or consent of instructor. A study of the creative approach to singing, listening, playing, rhythmic activity, and composition. These topics are studied in correlation with other areas and creative programs. (Grentzer.)

**MUS. ED. 128. MUSIC FOR THE ELEMENTARY CLASSROOM TEACHER. (2-3)**

Prerequisite, Music 16 or consent of instructor. A study of the group activities and materials through which the child experiences music. The course is designed to aid the classroom teacher. It includes an outline of objectives and a survey of instructional methods. (Eisenstadt.)

**MUS. ED. 129. METHODS AND MATERIALS FOR CLASS INSTRUMENTAL INSTRUCTION. (2)**

Prerequisite or concurrent registration in Music 61-66. Two one-hour laboratories and one lecture per week. Instructional materials for instrumental classes in elementary and junior high schools with emphasis on rehearsal techniques and including wind, string, and percussion areas. (Dunham.)

**MUS. ED. 132. MUSIC IN SECONDARY SCHOOLS. (2-3)**

Prerequisite, consent of instructor. A study of the music program in the secondary schools with the emphasis on methods and materials for general music. The needs in general music are surveyed, and the relationship of music to the general education program is investigated. (Eisenstadt.)

**MUS. ED. 139. MUSIC FOR THE ELEMENTARY SCHOOL SPECIALIST. (2)**

First semester. Prerequisite, consent of instructor. A survey of instructional materials; objectives; organization of subject matter; lesson planning methods and procedures in singing, listening, rhythms, simple instruments, and creative activities for the music specialist in the elementary school. (Eisenstadt, Shelley.)

**MUS. ED. 155. ORGANIZATION AND TECHNIQUE OF INSTRUMENTAL CLASS INSTRUCTION. (3)**

Prerequisite, consent of instructor. Practical instruction in the methods of tone production, tuning, fingering, and in the care of woodwind and brass instruments. A survey of the materials and published methods for class instruction. (Dunham.)

**MUS. ED. 163. BAND AND ORCHESTRA TECHNIQUES AND ADMINISTRATION. (2)**

Prerequisite: Music 61-67 and 161. Two lectures per week. Intensive study of instructional materials, organization, scheduling, budgeting, purchasing, and programming for the high school instrumental program. Band pageantry will be included. (Dunham.)

**MUS. ED. 170. METHODS AND MATERIALS FOR CLASS PIANO INSTRUCTION. (2)**

The study of the principles and techniques of teaching class piano. The following groups, beginning and advanced, will be used for demonstrations: elementary school children, junior and senior high school students, adults. Special emphasis will be placed on the analysis of materials. (de Vermond.)

**MUS. ED. 171. STRING TEACHING IN THE PUBLIC SCHOOLS. (2)**

A study of the problems of organizing and developing the string program in the public schools. Emphasis is placed on exploratory work in string instru-

## MUSIC EDUCATION

ments, on the study of teaching techniques, and on the analysis of music literature for solo, small ensembles, and orchestra. (Berman.)

### MUS. ED. 173. THE VOCAL MUSIC TEACHER AND SCHOOL ORGANIZATION. (2)

Prerequisite, practice teaching or teaching experience, or concurrent registration in practice teaching. Intensive study of the function of the vocal music teacher in the elementary and secondary schools. Open to graduate students by permission of instructor. (Eisenstadt, Shelley.)

### MUS. ED. 175. METHODS AND MATERIALS IN VOCAL MUSIC FOR SECONDARY SCHOOLS. (2)

Prerequisite, consent of instructor. A survey of suitable vocal and choral repertoire for the high school. Problems of diction, interpretation, tone production, and phrasing. The course is designed primarily for choral directors and teachers of voice classes. (Grentzer.)

### MUS. ED. 180. INSTRUMENTAL MUSIC FOR SECONDARY SCHOOLS. (2)

Prerequisite, consent of instructor. A survey of the repertoires for high school orchestra, band, and small ensemble. Problems of interpretation, intonation, tone quality, and rehearsal techniques. The course may be repeated for credit, since different repertoires are covered each time the course is offered. (Dunham.)

## *For Graduates*

### MUS. ED. 200. RESEARCH METHODS IN MUSIC AND MUSIC EDUCATION. (3)

The application of methods of research to problems in the fields of music and music education. The preparation of bibliographies and the written exposition of research projects in the area of the student's major interest. (Grentzer.)

### MUS. ED. 201. ADMINISTRATION AND SUPERVISION OF MUSIC IN THE PUBLIC SCHOOLS. (3)

The study of basic principles and practice of supervision and administration with emphasis on curriculum construction, scheduling, budgets, directing of in-service teaching, personnel problems, and school-community relationships. (Grentzer.)

### MUS. ED. 204. CURRENT TRENDS IN MUSIC EDUCATION. (3)

A survey of current philosophies and objectives of music in the schools. The scope and sequence of the music curricula, vocal and instrumental, on the elementary and secondary levels. (Grentzer.)

### MUS. ED. 205. VOCAL MUSIC IN THE ELEMENTARY SCHOOLS. (3)

A comparative analysis of current methods and materials used in the elementary schools. A study of the music curriculum as a part of the total school program, and of the roles of the classroom teacher and the music specialist. (Grentzer.)

### MUS. ED. 206. CHORAL CONDUCTING AND REPERTOIRE. (3)

The study and reading of choral literature of all periods, including the contemporary, suitable for use in school and community choruses. Style, interpretation, tone quality, diction, rehearsal and conducting techniques are analyzed. (Staff.)

**MUS. ED. 207. VOCAL MUSIC IN THE SECONDARY SCHOOLS. (3)**

A comparative analysis of current methods and materials used in teaching junior and senior high-school classes in general music, history and appreciation, theory, and voice, and in directing choral groups and community singing.

(Grentzer.)

**MUS. ED. 208. THE TEACHING OF MUSIC APPRECIATION. (3)**

A study of the objectives for the elementary and secondary levels; the techniques of directed listening, the presentation of theoretical and biographical materials, course planning, selection and use of audio-visual aids and library materials, and the correlation between music and other arts.

(Ulrich.)

**MUS. ED. 209. SEMINAR IN INSTRUMENTAL MUSIC. (2)**

A consideration of acoustical properties and basic techniques of the instruments. Problems of ensemble and balance, intonation, precision, and interpretation are studied. Materials and musical literature for orchestra, bands, and small ensembles are evaluated.

(Dunham.)

**MUS. ED. 210. ADVANCED ORCHESTRATION AND BAND ARRANGING (SEMINAR). (2)**

Prerequisite, Music 147 or the equivalent, or consent of the instructor. A study of arranging and transcription procedures in scoring for the orchestra and band. Special attention is given to the arranging problems of the instrumental director in the public schools.

(Trimble.)

**MUS. ED. 250. HISTORY AND AESTHETICS OF MUSIC EDUCATION. (3)**

Prerequisite, permission of instructor. The study of the development of pedagogical practices in music education, their aesthetic implications and educational values.

(Grentzer.)

## SPECIAL EDUCATION

*For Advanced Undergraduates and Graduates*

**SP. ED. 170. INTRODUCTION TO SPECIAL EDUCATION. (3)**

Designed to give an understanding of the needs of all types of exceptional children, stressing preventive and remedial measures.

(Campbell, Renz, Simms.)

**SP. ED. 171. CHARACTERISTICS OF EXCEPTIONAL CHILDREN. (3-6)**

A. Mentally Retarded. B. Gifted. C. Perceptual Learning Problems. Prerequisite, Sp. Ed. 170 or equivalent. Studies the diagnosis, etiology, physical, social, and emotional characteristics of exceptional children.

(Renz, Simms.)

**SP. ED. 172. EDUCATION OF EXCEPTIONAL CHILDREN. (3-6)**

A. Mentally Retarded. B. Gifted. C. Perceptual Learning Problems. Prerequisite, Sp. Ed. 171 or equivalent. Offers practical and specific methods of teaching exceptional children. Selected observation of actual teaching may be arranged.

(Campbell, Simms.)

**SP. ED. 173. CURRICULUM FOR EXCEPTIONAL CHILDREN. (3-6)**

A. Mentally Retarded. B. Gifted. Prerequisite, Sp. Ed. 171 or equivalent. Examines the principles and objectives guiding curriculum for exceptional chil-

## SPECIAL EDUCATION

dren; gives experience in developing curriculum for these children; studies various curricula currently in use. (Campbell, Hebeler.)

### SP. ED. 175. EDUCATION OF THE SLOW LEARNER. (3)

Course content includes the characteristics of the slow learner and those educational practices which are appropriate for the child who is functioning as a slow learner. (Hebeler.)

#### *For Graduates*

### SP. ED. 200. EXCEPTIONAL CHILDREN AND YOUTH. (3)

Prerequisite, consent of instructor. Deals primarily with research relevant to the intellectual, psychological, physical, and emotional characteristics of exceptional children. (Renz.)

### SP. ED. 201. EMOTIONALLY HANDICAPPED CHILDREN AND YOUTH. (3)

Prerequisite, Special Education 200 and consent of instructor. Deals with epidemiology, etiology classification, diagnostic procedures, behavioral characteristics, treatment and prevention of child and adolescent disturbances. (Huber.)

### SP. ED. 205. THE EXCEPTIONAL CHILD AND SOCIETY. (3)

Prerequisite, Sp. Ed. 200 or consent of instructor. Relationship of the role and adjustment of the child and/or adult and exceptionality to societal characteristics. (Renz.)

### SP. ED. 210. ADMINISTRATION AND SUPERVISION OF SPECIAL EDUCATION PROGRAMS. (3)

Prerequisite, consent of instructor. Consideration of the determination, establishment and function of educational programs for exceptional children for administrative and supervisory personnel. (Hebeler.)

### SP. ED. 215. EVALUATION AND MEASUREMENT OF EXCEPTIONAL CHILDREN AND YOUTH. (3)

Prerequisite, Ed. 150, 151, Sp. Ed. 200.

Deals with the understanding and interpretation of the results of psychological and educational tests applicable for use with exceptional children. (Simms, Campbell.)

### SP. ED. 220. EDUCATIONAL DIAGNOSIS AND PLANNING FOR EXCEPTIONAL CHILDREN AND YOUTH. (3)

Prerequisite, Sp. Ed. 215. Deals with the identification of learning characteristics of exceptional children and the planning of appropriate programs. (Campbell, Hebeler.)

### SP. ED. 221. PSYCHO-EDUCATIONAL PROGRAMMING WITH EMOTIONALLY HANDICAPPED CHILDREN AND YOUTH. (3)

Prerequisite, Special Education 200, Special Education 201 and consent of instructor. Deals with factors pertinent to therapeutic education of disturbed children and adolescents in special treatment settings. (Huber.)

### SP. ED. 225. PROBLEMS IN THE EDUCATION OF THE MENTALLY RETARDED. (3)

Prerequisite, 9 hours Sp. Ed. including Sp. Ed. 200, or consent of instructor. Consideration of the pertinent psychological, educational, medical, sociological

and other relevant research and theoretical material relevant to the determination of trends, practices, regarding the mentally retarded. (Renz.)

**SP. ED. 230. PROBLEMS IN THE EDUCATION OF THE GIFTED. (3)**

Prerequisite, 9 hours Sp. Ed. including Sp. Ed. 200 or consent of instructor. Consideration of the pertinent psychological, educational, medical, sociological and other relevant research and theoretical material relevant to the determination of trends, practices, regarding the gifted. (Hebeler, Simms.)

**SP. ED. 235. PROBLEMS IN THE EDUCATION OF CHILDREN WITH EMOTIONAL DISTURBANCES. (3)**

Prerequisite, 9 hours Sp. Ed. including Sp. Ed. 200 or consent of instructor. Consideration of the pertinent psychological, educational, medical, sociological and other relevant research and theoretical material relevant to the determination of trends, practices, regarding the emotionally disturbed. (Huber.)

**SP. ED. 240. PROBLEMS IN THE EDUCATION OF CHILDREN WITH PERCEPTUAL IMPAIRMENT. (3)**

Prerequisite, 6 hours in Education of the Perceptually Impaired, Special Education 215, and Special Education 220 or consent of instructor. Consideration of the pertinent psychological, educational, medical, sociological and other relevant research and theoretical material relevant to research and relevant to the determination of trends and practices regarding the perceptually impaired. (Hebeler, Campbell.)

**SP. ED. 278. SEMINAR IN SPECIAL EDUCATION. (2)**

Prerequisite, 9 hours in Special Education or consent of instructor. An overview of education of exceptional children. (Hebeler.)

---

Note: For courses in physical education and health education see the catalog of the College of Physical Education, Recreation, and Health.

# The 1966-68 Faculty

**ADKINS, Arthur J.**, Associate Professor of Education, Department of Secondary Education

B.S., State Teachers College, St. Cloud, Minnesota, 1942; M.A., University of Minnesota, 1947; Ph.D., 1958.

**AGRE, Gene P.**, Assistant Professor of Education

B.A., Macalester College, 1951; B.S., University of Minnesota, 1953; M.A., 1956; Ph.D., University of Illinois, 1964.

**ANDERSON, Evelyn J.**, Assistant Professor of Education, Library Science Education and Department of Early Childhood-Elementary Education

A.B., Bethany College, 1935; M.A., University of Chicago, 1957.

**ANDERSON, J. Paul**, Associate Professor of Education

B.S., University of Minnesota, 1942; M.A., 1947; Ph.D., 1960.

**ANDERSON, Vernon E.**, Professor of Education and Dean of the College of Education

B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.

**AOKI, Hideo**, Lecturer in Education, College of Education and University College, Far East Division

A.B., Kletzing College, 1945; M.A., Drake University, 1955; Ph.D., Stanford University, 1957.

**ASHLOCK, Robert B.**, Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.S., Butler University, 1957; M.S., 1959; Ed.D., Indiana University, 1965.

**BEUSCH, Ann**, Instructor in Education and Foreign Languages, Department of Secondary Education

B.A., McGill University, Montreal, Canada; 1948, M.A., University Laval, Quebec, Canada, 1949; M.Ed., Johns Hopkins University, 1960.

**BLAYLOCK, Marilyn Jean**, Instructor in Education, Institute for Child Study and Department of Early Childhood-Elementary Education and University Nursery-Kindergarten Laboratory School

B.S., Brigham Young University, 1957; M.S., 1964.

**BLOUGH, Glenn O.**, Professor of Education, Department of Early Childhood-Elementary Education

B.A., University of Michigan, 1929; M.A., 1932; LL.D., Central Michigan College of Education, 1950.

**BOTT, Margaret**, Assistant Professor of Education and Counselor in Counseling Center

B.A., St. John's University, 1952; M.S., Hunter College, 1959; Ph.D., Michigan State University, 1962.

## FACULTY

- BOWIE, B. Lucile, Associate Professor of Education, Institute for Child Study  
B.S., University of Maryland, 1942; M.A., Teachers College, Columbia University, 1946; Ed.D., University of Maryland, 1957.
- BROOME, Eleanor A., Instructor in Education, Institute for Child Study and Department of Early Childhood-Elementary Education and University Nursery-Kindergarten Laboratory School  
B.A., University of Maryland, 1943; M.Ed., 1957.
- BROWN, Dale W., Assistant Professor of Education, Library Science Education  
B.A., David Lipscomb College, 1953; M.A., George Peabody College for Teachers, 1955; A.M.L.S., University of Michigan, 1965.
- BROWN, Lillian W., Instructor in Education (part time), Department of Early Childhood-Elementary Education  
B.A., Lake Erie College, 1930.
- BRYAN, Marie D., Associate Professor of Education, Department of Secondary Education  
B.A., Goucher College, 1923; M.A., University of Maryland, 1945.
- BURNES, Bruce B., Instructor in Education (part time), Faculty Development Program  
B.S., Macalester College, 1960; M.A., University of Minnesota, 1964.
- BYRNE, Richard H., Professor of Education and Project Director, Interprofessional Research Commission on Pupil Personnel Services (IRCOPPS)  
B.A., Franklin and Marshall College, 1938; M.A., Columbia University, 1947; Ed. D., 1952.
- CALDWELL, Oliver J., Visiting Professor of Comparative Education  
B.A., Oberlin College, 1926; M.A., 1927.
- CAMPBELL, Dorothy D., Lecturer in Education, Special Education  
B.A., College of Idaho, 1961; M.A., Peabody College, 1962.
- CHAPIN, John L., Associate Professor of Education, Institute for Child Study  
A.B., Denison University, 1939; Ph.D., University of Rochester, 1950.
- COLE, Mildred B., Lecturer in Education and Mathematics, University of Maryland Mathematics Project (UMMaP), Department of Secondary Education and Department of Early Childhood-Elementary Education  
B.S., University of Illinois, 1943; M.S., University of Wisconsin, 1951.
- COLLINS, James F., Assistant Professor of Education, Department of Early Childhood-Elementary Education and Coordinator of Laboratory Experience  
B.Ed., University State Teachers College, New York, 1949; M.S., 1953.
- CROSBY, Edmund D., Assistant Professor of Industrial Education, Department of Industrial Education  
B.A., Western Michigan University, 1934; M.A., Colorado State University, 1940.

## FACULTY

**CROWCROFT, Harry G.**, Assistant Instructor in Education and Mathematics (part-time), University of Maryland Mathematics Project (UMMaP), Department of Secondary Education

B.S., Western Illinois University, 1959; M.S., University of Maryland, 1962.

**DAVIS, Robert M.**, Research Assistant in Study for Vocational Rehabilitation

B.S., Salisbury State, 1958; M.Ed., Pennsylvania State University, 1962.

**DAYTON, Chauncey M.**, Assistant Professor of Education and Research Coordinator, Interprofessional Research Commission on Pupil Personnel Services (IRCOPPS)

B.A., University of Chicago, 1955; M.A., University of Maryland, 1963; Ph.D., 1964.

**DE BERUFF, Ellen**, Instructor in Education (part time)

A.A., Armstrong Junior College, 1949; B.A., University of Maryland, 1961.

**DiLAFORE, Philip III**, Assistant Professor of Education and Physics, Department of Secondary Education

B.A., Dakota Wesleyan University, 1954; M.S., University of Michigan, 1961.

**DISHART, Martin**, Lecturer in Education and Project Coordinator, Study for Vocational Rehabilitation and Associate Director of the Bureau of Educational Research and Field Services

B.S., City College of New York, 1950; Ph.D., George Washington University, 1960. 1960.

**DITTMAN, Laura L.**, Instructor in Education (part time) Faculty Development Program, Institute for Child Study

B.S., University of Colorado, 1938; M.A., University of Maryland, 1963.

**DUDLEY, James**, Assistant Professor of Elementary School Administration and Supervision

B.A., Southern Illinois University, 1951; M.S., 1957; Ed. D., University of Illinois, 1964.

**DUFFEY, Robert V.**, Professor of Education and Head, Department of Early Childhood-Elementary Education

B.S., Millersville State College, 1938; M.Ed., Temple University, 1948; Ed.D., 1954.

**DUNHAM, Richard L.**, Associate Professor of Education and Music, Department of Secondary Education

B.A., Ohio Wesleyan University, 1947; M.A., University of Michigan, 1949; Ph.D., 1961.

**EDGEMON, Albert W.**, Assistant Professor of Education, Department of Early Childhood-Elementary Education, and Assistant Coordinator of Laboratory Experiences

A.B., University of Florida, 1950; M.A., Columbia University, 1954; Ed.D., 1964.

**EHRLE, Raymond A.**, Lecturer in Education and Vocational Rehabilitation Counselor Training Coordinator

A.B., Syracuse University, 1951; M.A., George Washington University, 1956; Ed.D., University of Missouri, 1961.

## FACULTY

EISENSTADT, Beula, Assistant Professor of Music and Music Education, Department of Secondary Education

B.A., Queens College, 1949; M.A., Columbia University, 1954.

FARRAND, Charlotte, Instructor in Education, Institute for Child Study and Department of Early Childhood-Elementary Education and University Nursery Kindergarten Laboratory School

B.S., Iowa State University, 1960.

FARRELL, Richard T., Assistant Professor of Education and History, Department of Secondary Education

A.B., Wabash College, 1954; M.S., Indiana University, 1958.

FINKELSTEIN, Barbara J. E., Assistant Professor of Education

B.A., Barnard College, 1959; M.A., Teachers College, Columbia University, 1960.

FISHER, John K., Lecturer in Education and Staff Associate, Interprofessional Research Commission on Pupil Personnel Services. (IRCOPPS)

B.A., Alfred University, 1952; M.S., 1953; Ed.D., University of Maryland, 1964.

FITCH, Robert M., Assistant Professor of Education, Department of Secondary Education

B.A., University of Florida, 1959; M.Ed., 1961; Ph.D., State University of Iowa, 1965.

FOURACRE, Maurice H., Lecturer in Education (part time), Special Education

A.B., University of Michigan, 1935; A.M., 1940; Ph.D., 1942.

FRANK, Allen D., Assistant Professor of Education and Speech, Department of Secondary Education

B.S., University of Wisconsin, 1953; University of Wisconsin, 1954.

FRANTZ, Nevin R., Project Director in Industrial Education, Department of Industrial Education

B.S., Millersville State College, 1959; M.A., University of Maryland, 1964.

FUNARO, George J., Assistant Professor of Education, Department of Secondary Education

B.S., American International College, 1956; M.A., Ph.D., University of Connecticut, 1965.

FUNKHOUSER, Beverly, Instructor in Education, Department of Secondary Education and Institute for Child Study and Assistant Coordinator of Laboratory Experiences

B.A., Western Washington State College, 1959; M.Ed., University of Maryland, 1965.

GARDNER, Marjorie, Assistant Professor of Education and Chemistry, Department of Secondary Education

B.S., Utah State University, 1946; M.A., Ohio State University, 1958; Ph.D., 1960.

GARSTENS, Helen, Assistant Professor of Education and Mathematics, Department of Secondary Education

B.A., Hunter College, 1932.

## FACULTY

- GATES, Jean K., Instructor in Education (part-time), Library Science Education  
B.A., Hendrix College, Arkansas, 1930; M.S.L.S., Catholic University of America, 1951.
- GERBERICH, J. Raymond, Visiting Professor of Education (part time)  
B.S., University of Iowa, 1922; M.A., 1928; Ph.D., 1929.
- GETTLE, Karl E., Instructor in Industrial Education, Department of Industrial Education  
B.A., Millersville State Teachers College, 1959; M.A., University of Maryland, 1964.
- GIBLETTE, John, Associate Professor of Education and Assistant Director, Testing and Research, Counseling Center  
B.A., George Washington University, 1947; M.A., University of Minnesota, 1952; Ph.D., University of Pennsylvania, 1960.
- GINSBERG, Sadie D., Instructor in Education (part time), Department of Early Childhood-Elementary Education and University College (Baltimore)  
B.A., Goucher College, 1922.
- GOERING, Jacob D., Associate Professor of Education, Intitute for Child Study  
B.A., Bethel College, 1941; B.D., Bethany Seminary, 1949; Ph.D., University of Maryland, 1959.
- GOLDEN, Loretta, Visiting Lecturer in Education, Department of Early Childhood-Elementary Education  
A.A., Los Angles City College, 1949; B.A., University of California at Los Angeles, 1951; M.S., Stanford University, 1956; Ed.D., 1964.
- GOLDIN, Jessica, Lecturer in Education and Spanish, Department of Secondary Education  
B.A., Long Island University, 1939; M.A., Columbia University, 1941
- GRAMBS, Jean D., Associate Professor of Education, Department of Secondary Education  
A.B., Reed College, 1940; M.A., Stanford University, 1941; Ed.D., 1948.
- GREEN, Kinsey B., Instructor in Education (part time), Faculty Development Program, Department of Secondary Education  
B.S., Martha Washington College, Virginia, 1960; M.S., University of Maryland, 1964.
- GREENBERG, Kenneth, Assistant Professor of Education  
B.S., Ohio State University, 1951; M.A., 1952; Ph.D., Western Reserve University, 1960.
- GRENTZER, Rose Marie, Professor of Education and Music, Department of Secondary Education  
B.A., Mus. Ed., Carnegie Institute of Technology, 1935; B.A., 1936; M.A., 1939.
- GRIMES, Katherine, Instructor in Education and English, Department of Secondary Education  
B.A., University of Maryland, 1953; M.A., 1954.

GUY, Kenneth H., Jr., Instructor in Industrial Education, Department of Industrial Education

B.S., State University of New York, 1959; M.S., 1962.

HALL, Harvey, Instructor in Education (part time), Department of Secondary Education

B.S., Washington College, 1949; M.E., University of Maryland, 1962.

HALL, Mary Anne, Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.A., Marshall University, 1955; M.Ed., University of Maryland, 1959.

HAMBY, Trudy M., Instructor in Education, Institute for Child Study

B.A., Eastern Washington College of Education, 1943; M.Ed., University of Maryland, 1963.

HARRISON, Paul E., Jr., Professor of Industrial Education, Department of Industrial Education

B.Ed., Northern Illinois State College, 1942; M.A., Colorado State College, 1947; Ph.D., University of Maryland, 1955.

HATFIELD, Agnes B., Assistant Professor of Education, Institute for Child Study

B.A., University of California, 1948; M.A., University of Denver, 1954; Ph.D., 1959.

HEBELER, Jean R., Associate Professor of Education and Coordinator of Special Education Programs

B.S., State University of New York, College for Teachers, 1953; M.S., University of Illinois, 1956; Ed.D., Syracuse University, 1960.

HENKELMAN, James H., Assistant Professor of Education and Mathematics, and Assistant Director of University of Maryland Mathematics Project (UMMaP), Department of Secondary Education

B.S., Miami University, Oxford, Ohio, 1954; M.Ed., 1955; Ed.D., Harvard University, 1965.

HERMAN, Wayne L., Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.A., Ursinus College, 1955; M.Ed., Temple University, 1960; Ed.D., 1965.

HORNBAKE, R. Lee, Professor of Industrial Education and Vice-President for Academic Affairs

B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.

HOVET, Kenneth O., Professor of Education

B.A., St. Olaf College, 1926; Ph.D., University of Minnesota, 1950.

HUBER, Franz E., Assistant Professor of Education, Special Education

B.A., University of Michigan, 1951; M.A., 1953; Ph.D., University of Illinois, 1964.

## FACULTY

**HYMES, James L., Jr.**, Professor of Education, Department of Early Childhood-Elementary Education and Institute for Child Study and Director, University Nursery-Kindergarten Laboratory School

B.A., Harvard College, 1934; M.A., Teachers College, Columbia University, 1936; Ed.D., 1947.

**JACOBS, Linda W.**, Research Assistant in Education, Special Education

B.A., University of Maryland, 1962; M.A., 1965.

**JAMES, M. Lucia**, Associate Professor of Education, Library Science Education, and Director of the Curriculum Laboratory

A.B., North Carolina College, 1945; M.S., University of Illinois, 1949; Ph.D., University of Connecticut, 1963.

**KASTNER, Bernice**, Assistant Instructor in Education and Mathematics (part-time), University of Maryland Mathematics Project (UMMaP), Department of Secondary Education

B.S., McGill University, 1952; M.A., Syracuse University, 1959.

**KELLY, Vincent P.**, Assistant Professor of Education and Foreign Languages, Department of Secondary Education

B.A., Manhattan College, 1955; M.A., Hunter College, 1958; Ph.D., Indiana University, 1965.

**KELSEY, Roger R.**, Associate Professor of Education

B.A., St. Olaf College, 1934; M.A., University of Minnesota, 1940; Ed.D., George Peabody College for Teachers, 1954.

**KICKLIGHTER, Clois E.**, Instructor in Industrial Education, Department of Industrial Education

B.S.Ed., University of Florida, 1962; M.S., Indiana State College, 1963.

**KLEVAN, Albert**, Assistant Professor of Education, Institute for Child Study

B.S., Temple University, 1948; M.Ed., 1950; Ed.D., New York University, 1957.

**KOLB, John R.**, Assistant Instructor in Education and Mathematics (part-time), University of Maryland Mathematics Project (UMMaP), Department of Secondary Education

B.A., University of Maryland, 1961.

**KORB, L. David**, Instructor in Industrial Education (part-time), Department of Industrial Education

B.A., Brown University, 1939; M.A., Boston University, 1952.

**KUNZ, T. Jean**, Instructor in Education, Institute for Child Study and Department of Early Childhood-Elementary Education and University Nursery-Kindergarten Laboratory School

B.S., University of Idaho, 1940; M.A., George Peabody College, 1956.

**KURTZ, John J.**, Professor of Education and Assistant Director, Institute for Child Study

B.A., University of Wisconsin, 1935; M.A., Northwestern University, 1940; Ph.D., University of Chicago, 1947.

## FACULTY

- KYLE, David G., Assistant Professor of Education, Institute for Child Study  
A.B., University of Denver, 1962; M.A., 1953; Ed.D., University of Maryland, 1961.
- LARSON, Gerald L., Assistant Professor of Education, Institute for Child Study  
B.S., Indiana University, 1956; M.S., 1957; Ph.D., University of Illinois, 1963.
- LAWRENCE, Richard, Assistant Professor of Education  
B.S., Michigan State University, 1955; M.A., 1957; Ph.D., 1965.
- LAWSON, John R., Assistant Professor of Education, Institute for Child Study  
B.A., Long Beach State College, 1958; M.A., 1959; Ed.D., University of Nebraska, 1962.
- LEEPER, Sarah Lou Hammond, Professor of Education, Department of Early Childhood-Elementary Education  
A.B., Florida State College for Women, 1932; M.A., Florida State University, 1947; Ed.D., 1953.
- LEMMON, Louise, Associate Professor of Education and Home Economics, Department of Secondary Education  
B.S., Northern Illinois University, 1945; M.S., University of Wisconsin, 1951; Ed.D., University of Illinois, 1961.
- LIDDLE, Gordon P., Lecturer in Education and Director Interprofessional Research Commission on Pupil Personnel Services (IRCOPPS)  
B.A., Oberlin College, 1947; Ph.D., University of Chicago, 1959.
- LINDSAY, Rao H., Assistant Professor of Education  
B.A., Brigham Young University, 1954; M.A., 1958; University of Michigan, Ph.D., 1964.
- LISKE, Wilfred W., Instructor in Education (part time), Faculty Development Program, Department of Early Childhood-Elementary Education  
Th.B., Canadian Union College, 1951; Diploma in Education, University of the West Indies, 1958; M.A., Andrews University, 1964.
- LOCKARD, J. David, Associate Professor of Education and Botany, and Director of Science Teaching Center, Department of Secondary Education  
B.S., Pennsylvania State University, 1951; M.Ed., Pennsylvania University, 1955; Ph.D., 1961.
- LONGLEY, Edward L., Jr., Assistant Professor of Education and Art, Department of Secondary Education  
A.B., University of Maryland, 1950; M.A., Columbia University, 1953.
- LUETKEMEYER, Joseph F., Jr., Associate Professor of Industrial Education, Department of Industrial Education  
B.S., Stout State College, 1953; M.S., 1954; Ed.D., University of Illinois, 1961.
- MAGOON, Thomas M., Professor of Education and Director of the University Counseling Center  
B.A., Dartmouth College, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.

## FACULTY

MALEY, Donald, Professor of Industrial Education and Head, Department of Industrial Education

B.S., State College, California, Pennsylvania, 1944; M.A., University of Maryland, 1947; Ph.D., 1950.

MARK, Julia P., Research Assistant in Study for Vocational Rehabilitation

B.A., Ohio State University, 1960

MARX, George L., Associate Professor of Education

B.A., Yankton College, South Dakota, 1953; M.A., State University of Iowa, 1957; Ph.D., 1959.

MATTESON, Richard L., Assistant Professor of Education, Institute for Child Study

B.A., Knox College, 1952; M.A., University of Maryland, 1955; Ed.D., 1962.

MAYOR, John R., Professor of Education and Mathematics (part-time) and Director of University of Maryland Mathematics Project, Department of Secondary Education

B.S., Knox College, Galesburg, Illinois, 1928; M.A., University of Illinois, 1929; Ph.D., University of Wisconsin, 1933; LL.D., Knox College, 1959.

McCLURE, L. Morris, Professor of Education and Assistant Dean of the College of Education

B.A., Western Michigan University, 1940; M.A., University of Michigan, 1946; Ed.D., Michigan State University, 1953.

McHEFFEY, Norris J., Instructor in Education (Part-Time), Faculty Development Program, Institute for Child Study

B.A., Western Washington College of Education, 1951; M.Ed., 1959.

MEESE, Billie, Lecturer in Education (part-time), Institute for Child Study

B.S., University of Akron, 1948; M.S., 1951; Ed.D., University of Maryland, 1961.

MERRILL, George R., Assistant Professor of Industrial Education, Department of Industrial Education

B.S., University of Maryland, 1953; M.Ed., 1955; Ed.D., 1964.

MERSHON, Madelaine J., Professor of Education, Institute for Child Study

B.S., Drake University, 1940; M.A., University of Chicago, 1943; Ph.D., 1950.

MERTENS, Robert P., Assistant Professor of Industrial Education, Department of Industrial Education

B.S., Pennsylvania State University, 1958; M.S., 1963.

MILHOLLAN, Frank E., Assistant Professor of Education, Institute for Child Study

B.A., Colorado College, 1949; M.P.S., University of Colorado, 1951; Ph.D., University of Nebraska, 1965.

MILLAR, Jean M., Instructor in Education and Counseling Center (part-time), Faculty Development Program

B.A., University of Maryland, 1961; M.A., 1963

MORGAN, H. Gerthon, Professor of Education and Director, Institute for Child Study

B.A., Furman University, 1940; M.A., University of Chicago, 1943; Ph.D., 1946.

## FACULTY

MOYER, Joan E., Instructor in Education (part-time), Faculty Development Program, Department of Early Childhood-Elementary Education

B.S., Kutztown State College, 1953; M.Ed., Pennsylvania State University, 1956.

NEVILLE, Richard F., Associate Professor of Education and Assistant to the Dean

B.S., Central Connecticut State College, 1953; M.A., Teachers College, Columbia University, 1957; Ph.D., University of Connecticut, 1963.

NEWELL, Clarence A., Professor of Educational Administration

B.A., Hastings College, Nebraska, 1935; M.A., Columbia University, 1939; Ph.D., 1943.

NOLL, James William, Assistant Professor of Education

B.A., University of Wisconsin, 1954; M.S., 1961; Ph.D., University of Chicago, 1965.

O'NEILL, Leo W., Professor of Education, Department of Early Childhood-Elementary Education

B.A., University of Chicago, 1938; M.A., University of Kansas City, 1953; Ed.D., University of Colorado, 1955.

ORR, David, Lecturer in Education (part-time)

A.B., and B.S., Wittenberg College, 1952; M.A., Teachers College, Columbia University, 1953; Ph.D., 1956.

PAGLEE, Jeanne B., Instructor in Education (part-time), Department of Early Childhood-Elementary Education

B.S., The Woman's College of Georgia, 1954; M.Ed., University of Georgia, 1958.

PATRICK, Arthur S., Professor of Office Management and Business Education, Department of Secondary Education

B.S., Wisconsin State University, Whitewater, Wisconsin, 1931; M.A., University of Iowa, 1940; Ph.D., American University, 1956.

PERKINS, Hugh V., Professor of Education and Deputy Director, Institute for Child Study

B.A., Oberlin College, 1941; M.A., University of Chicago, 1946; Ph.D., 1949; Ed.D., New York University, 1956.

PFAU, Donald W., Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.A., Grove City College, 1958; M.S., Buffalo State Teachers College, 1961; Ed.D., State University of New York at Buffalo, 1965.

PICKETT, Wilda D., Associate Professor of Education and Physical Education, Department of Secondary Education

B.S., Central Missouri State College, 1932; M.A., Teachers College, Columbia University, 1934; Ed.D., 1955.

PRESCOTT, Daniel A., Professor of Education and Director-Emeritus, Institute for Child Study

B.S., Tufts College, 1920; M.Ed., Harvard University, 1922; Ed.D., 1923.

## FACULTY

**RATHS, James D.**, Associate Professor of Education and Director, Bureau of Educational Research and Field Services (BERFS)

B.S., Yale University, 1954; M.A., 1955; Ph.D., New York University, 1960.

**RAY, Philip B.**, Assistant Professor of Education and Counselor in Counseling Center

B.A., Antioch College, 1950; M.S., University of Pennsylvania, 1955; Ph.D., University of Minnesota, 1962.

**RENZ, Paul**, Assistant Professor of Education, Special Education

B.S., Syracuse University, 1952; M.A., 1952; Ph.D., University of Illinois, 1962.

**RHOADS, David J.**, Assistant Professor of Education

B.A., Temple, 1954; M.A., 1958; Ed.D., University of Maryland, 1963.

**RISHEL, Darrell F.**, Assistant Professor of Education and Director of Office of Intermediate Registration

B.S., Penn State University, 1951; M.Ed., 1957; Ed.D., 1961.

**RISINGER, Robert G.**, Professor of Education and Head, Department of Secondary Education

B.S., Ball State Teachers College, 1940; M.A., University of Chicago, 1947; Ed.D., University of Colorado, 1955.

**RODGERS, Mary N. Columbro**, Assistant Professor of Education and English, Department of Secondary Education

B.A., Notre Dame College, 1957; M.A., Western Reserve University, 1962; Ph.D., Ohio State University, 1964.

**RUSSELL, Laila**, Assistant Professor of Education (part-time)

B.S., University of Ein Shams, Egypt, 1953; M.S., University of Wisconsin, 1958; Ph.D., 1962.

**SAWIN, Margaret M.**, Instructor in Education (Part-time), Faculty Development Program, Institute for Child Study

B.Sc.Ed., University of the State of New York at Oneonta, 1944; M.R.E., Eastern Baptist Theological Seminary, 1949.

**SCARR, Sandra W.**, Assistant Professor of Education (Part-time), Institute for Child Study

B.A., Vassar College, 1956; A.M., Harvard University, 1963; Ph.D., 1965.

**SCHACHT, Robert C.**, Instructor in Education (part-time), Department of Industrial Education, Faculty Development Program

B.S.E., University of Florida, 1960; M.Ed., 1961.

**SCHINDLER, Alvin W.**, Professor of Education, Department of Early Childhood-Elementary Education

B.A., Iowa State Teachers College, 1927; M.A., University of Iowa, 1929; Ph.D., 1934.

**SCHMIEDER, Allen**, Assistant Professor of Education and Geography, Department of Secondary Education

B.S., Edinboro State College, 1955; M.A., Ohio State University, 1956; Ph.D., Ohio State University, 1963.

## FACULTY

SCHRAMM, Carl S., Assistant Professor of Industrial Education, Department of Industrial Education

B.S., University of Maryland, 1956; M.Ed., 1965.

SEIDMAN, Eric, Assistant Professor of Education, Department of Early Childhood-Elementary Education and Associate Director and Demonstration Coordinator, Interprofessional Research Commission on Pupil Personnel Services (IRCOPPS)

B.S., New York University, 1947; M.A., 1948; Ph.D., University of Connecticut, 1964.

SHELLEY, Shirley J., Assistant Professor of Music and Music Education, Department of Secondary Education

B.Mus., University of Michigan, 1944; M.Mus., 1947.

SIMMS, Betty Howald, Assistant Professor of Education, Special Education

B.A., Harris Teachers College, 1947; M.A., University of Michigan, 1955; Ed.D., University of Maryland, 1962.

SMART, Dalton E., Jr., Instructor in Education (Part-time), Faculty Development Program, Department of Industrial Education

B.S.E., State College, Fitchburg, Massachusetts, 1963, M.A., University of Maryland, 1965

SMITH, George W., Lecturer in Education, College of Education and University College, European Division

B.A., University of Florida, 1956; M.T.S., University of Colorado, 1959; Ed.D., 1964.

SMITH, Wayne, Records Evaluator

B.S., University of Maryland, 1962.

SNIVELY, Gladys D., Instructor in Education (part-time), Department of Early Childhood-Elementary Education

B.S., University of Delaware, 1960; M.S. University of Pennsylvania, 1962.

SPENCER, Mabel S., Associate Professor of Home Economics Education, Department of Secondary Education

B.S., West Virginia University, 1925; M.S., 1946; Ed.D., American University, 1959.

STANT, Margaret A., Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.S., University of Maryland, 1952; M.Ed., 1955; A.P.C., George Washington University, 1959.

STEVENSON, Carol Ann, Instructor in Education (part-time), Department of Early Childhood-Elementary Education

B.S., State University College of Education at Oneonta, New York, 1950; M.A., Teachers College, Columbia University, 1957.

STUNKARD, Clayton L., Associate Professor of Education

B.A., University of Minnesota, 1948; M.A., 1951; Ph.D., 1959.

## FACULTY

SULLIVAN, Dorothy D., Assistant Professor of Education, Department of Early Childhood-Elementary Education

A.B., University of Maryland, 1945; M.Ed., 1960; Ed.D., 1965.

TACKETT, Anna, Assistant Director of Placement and Credentials Service

B.A., University of Maryland, 1943.

THOMPSON, Fred R., Professor of Education, Institute for Child Study

B.A., University of Texas, 1929; M.A., 1935; Ed.D., University of Maryland, 1952.

TIERNEY, William P., Associate Professor of Industrial Education, Department of Industrial Education

B.S., Teachers College of Connecticut, 1941; M.A., Ohio State University, 1949; Ed.D., University of Maryland, 1952.

VANAMAN, Sherman, Instructor in Education (Part-time), University of Maryland Mathematics Project (UMMaP), Faculty Development Program, Department of Secondary Education

B.A., University of Louisville, 1949; M.S., University of Kentucky, 1954.

VAN NESS, James, Instructor in Education and History, Department of Secondary Education

B.A., University of Maryland, 1954; M.A., 1962.

van ZWOLL, James A., Professor of School Administration

B.A., Calvin College, Grand Rapids, Michigan, 1933; M.A., University of Michigan, 1937; Ph.D., 1942.

WAETJEN, Walter B., Professor of Education and Assistant to the President for Administrative Affairs

B.S., State Teachers College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.

WALBESSER, Henry H., Assistant Professor of Education and Mathematics (part-time), Department of Secondary Education

B.S., State University of New York, 1958; M.A., University of Maryland, 1960; Ph.D., 1964.

WARNER, Gordon, Lecturer in Education, College of Education and University College, Far East Division

B.S., University of Southern California, 1936; M.A., 1944; M.A., 1950; Ed.D., 1955.

WEAVER, V. Phillips, Assistant Professor of Education, Department of Early Childhood-Elementary Education

A.B., College of William and Mary, 1951; M.Ed., Pennsylvania State University, 1956; Ed.D., 1962.

WEDBERG, Desmond P., Associate Professor of Education

A.B., University of Southern California, 1947; A.M., 1948; Ed.D., 1963.

WIGGIN, Gladys A., Professor of Education and Director of Graduate Studies

B.S., University of Minnesota, 1929; M.A., 1939; Ph.D., University of Maryland, 1947.

## FACULTY

**WILLIAMS, David L.**, Assistant Professor of Education, Department of Early Childhood-Elementary Education

B.S., Bradley University, 1952; M.Ed., University of Illinois, 1956; Ed.D., 1964.

**WILSON, Robert M.**, Associate Professor of Education and Director of the Reading Center, Department of Early Childhood-Elementary Education

B.S., California State Teachers College, Pennsylvania, 1950; M. S., University of Pittsburgh, 1956; Ed.D., 1960.

**WISE, Pauline K.**, Instructor in Education (Part-time), Faculty Development Program, Department of Early Childhood-Elementary Education

B.S., University of Wisconsin, 1938; M.Ed., Boston University, 1952.

**WOODS, Albert W.**, Associate Professor of Education and Physical Education, Department of Secondary Education

B.S., University of Maryland, 1933; M.Ed., 1949.

**ZACHARY, Lillian B.**, Assistant Professor of Education, Department of Early Childhood-Elementary Education

A.B., University of North Carolina, 1943; M.A., Florida State University, 1955; Ed.D., 1960.

## COOPERATING FACULTY FROM OTHER COLLEGES

**ADDISON, Howard O.**, Assistant Professor of Agricultural and Extension Education

**ANDERSON, C. P.**, Instructor in Office Management and Techniques

**BOOKOUT, Eleanor**, Instructor in Art (part-time)

**CARDOZIER, V. R.**, Professor and Head of Agricultural and Extension Education

**EVERARD, Kenneth E.**, Assistant Professor of Office Management and Techniques

**FANOS, Stavroula**, Instructor in Music

**GESSNER, John E.**, Assistant Professor of Preventive Medicine, Physical Medicine and Rehabilitation, School of Medicine (Baltimore)

**GOOD, Richard**, Research Associate, Division of Institutional Research

**LEMBACH, John**, Professor, Department of Art

**LEVITINE, George**, Head, Department of Art

**McCLINTOCK, Robert**, Director, Division of Institutional Research

**O'NEILL, Jane H.**, Instructor in Office Management and Techniques

**SMITH, Clodus, R.**, Associate Professor of Agricultural and Extension Education

**TRIMBLE, Lester**, Professor of Music

**ULRICH, Homer**, Head, Department of Music

**WASSERMAN, Paul**, Dean, School of Library and Information Services

## FACULTY

### COLLEGE OF EDUCATION

#### *Graduate Assistants, Research Assistants and Fellows*

ABROMAITIS, Joseph J., Graduate Assistant in Education, Department of Industrial Education

B.S., Central Conn. State College, 1962; M.S., North Carolina State, North Carolina, 1963.

ADAMS, Larry L., NDEA Fellow and Graduate Assistant in Education (part-time)

B.S., Brigham Young University, 1961; M.Ed., 1966.

ALLAN, Thomas K., NDEA Fellow in Education

B.S., Northwestern University, 1950.

ALVERNAZ, Gloria L., Grant Foundation Fellow, Institute for Child Study

B.A., San Jose State College, 1959; M.S., Washington State University, 1960.

ANDERSON, Beatrice B., Graduate Assistant in Education, Department of Early Childhood-Elementary Education

A.A., Stephens College, 1947; B.A., San Francisco State College, 1958; M.A., Michigan State University, 1964.

BAGSTER-COLLINS, Richard, Graduate Assistant in Education, Vocational Rehabilitation Counselor Education

B.S., Springfield College, Massachusetts, 1959; M.Ed., 1961.

BARNES, Margaret, Graduate Assistant in Education, Institute for Child Study

B.A., Wellesley College, 1952.

BARON, Andrew W., Graduate Assistant in Education, Department of Industrial Education

B.S., Central Conn. State College, 1962; M.A., Ball State Teachers College, Muncie, Indiana, 1963.

BECKHAM, Gwendolyn, Fellow in Special Education

B.S., North Texas State University, 1963.

BISSETT, Wyatt H., Jr., Fellow in Special Education

B.A., George Washington University, 1964.

BLATT, Calvin, Graduate Assistant in Education

B.S., Kutztown State College, 1939; A.B., University of Pennsylvania, 1947; M.Ed., University of Maryland, 1960.

BRAGER, Gary, Graduate Assistant in Education

B.S., State Teachers College, Towson, Maryland, 1963.

BUSHER, Frederic H., Grant Foundation Fellow, Institute for Child Study

A.B., College of the Pacific, 1956; A.M., 1958.

BZOWSKI, Edward D., Graduate Assistant in Education, Department of Industrial Education

B.S., State University College at Buffalo, 1963; M.A., Ball State Teachers College, 1964.

- CHAPRASS, George, Graduate Assistant in Education  
B.S., Northeastern University, Boston, 1959.
- CHRISTOPLOS, Florence W., Fellow in Special Education  
B.A., Hunter College, New York, 1951.
- CLAGETT, Kathleen E., NDEA Fellow in Education  
B.S., Towson State College, 1958.
- CLARKE, Dorothy V., Research Assistant in Education, IRCOPPS  
B.S., Western Maryland College, 1957; M.Ed., University of Maryland, 1962.
- CLEARY, Mary D., Fellow in Special Education  
B.S., Georgetown University, 1962.
- COUSINS, Joan Lee, Graduate Assistant in Education, Department of Secondary Education  
George Washington University, 1956; M.Ed., University of Maryland, 1961.
- DEFFINBAUGH, Howard Davey, Graduate Assistant, Department of Early Childhood-Elementary Education  
B.A., Western Maryland, 1958.
- DEVORE, Paul, Research Assistant, Department of Industrial Education  
B.S., Ohio University, 1950; M.A., Kent State University, 1954; D.Ed., Pennsylvania State University, 1961.
- DEWILDE, Richard J., Graduate Assistant in Education and Trainee in Vocational Rehabilitation Counselor Education (part-time)  
B.S., College of William and Mary, 1959; M.A., University of Delaware, 1961.
- FECIK, John T., Jr., Graduate Assistant in Education, Department of Industrial Education  
B.S., State Teachers College, California, Pennsylvania, 1958.
- FLATTER, Charles H., Grant Foundation Fellow, Institute for Child Study  
B.A., DePauw University, 1961.
- FREEMAN, Lisabeth H., Graduate Assistant in Education, Department of Secondary Education  
B.A., Barnard College, 1961; M.A., Columbia, 1963.
- GALLINELLI, John W., Graduate Assistant in Education, Department of Industrial Education  
B.Ed., Keene State College, New Hampshire, 1963; M.Ed., 1965.
- GANTT, Walter N., Graduate Assistant in Education  
B.S., Coppin State Teachers College, 1942; New York University, 1949.
- GARVIN, Alfred D., NDEA Fellow and Graduate Assistant in Education (part-time)  
B.S., U.S. Naval Academy, 1941; M.A., University of Maryland, 1964.
- GATEWOOD, Jean, Graduate Assistant in Education, Department of Secondary Education  
A.B., Wilson College, 1950.

## FACULTY

- GENTILE, Louis, Graduate Assistant in Education, Institute for Child Study  
B.A., American International College, Springfield, Massachusetts, 1962; M.S.,  
Springfield College, 1964.
- GLICK, Irvin D., NDEA Fellow in Education  
A.B., University of Maryland, 1960; M.Ed., 1965.
- GOLDMAN, Judith A., Grant Foundation Fellow, Institute for Child Study  
B.A., Drake University, 1961.
- GONZALEZ, Manuel P., Graduate Assistant in Education, Curriculum Laboratory  
B.S., Bloomsburg State College, Pennsylvania, 1963.
- GOODMAN, Lorraine, Fellow in Special Education  
B.S., Johns Hopkins University, 1947.
- GRAHAM, Jo, Graduate Assistant in Education, Institute for Child Study  
B.S., Brigham Young University, 1940; M.A., George Peabody College for Teachers,  
1959.
- GREEN, Carlyle F., Grant Foundation Fellow, Institute for Child Study  
A.B., Atlantic Union College, 1952; M.S., University of Southern California, 1960;  
M.Ed., 1960.
- GROTLISCH, Kathryn L., Graduate Assistant, Department of Early Childhood-Elementary Education  
B.A., Duke University, 1939.
- HAEFNER, Robert E., Graduate Assistant, Department of Early Childhood-Elementary Education  
B.S., Brockport State College, 1953; M.S., Brockport State College, 1962.
- HALL, JOHN W., Graduate Assistant in Education, Bureau of Educational Research and Field Services
- HERMAN, Patricia E., Fellow in Special Education  
B.A., University of Rhode Island, 1962.
- HERSON, Phyllis E., Graduate Assistant in Education  
B.S., Wilson Teachers College, 1951.
- HICKS, Carol E., Graduate Assistant in Education, Department of Industrial Education  
B.A., Western Illinois University, Macomb, Illinois, 1965.
- HUNT, Edith J., Grant Foundation Fellow, Institute for Child Study  
A.B., University of Redlands, 1954; M.A., Claremont Graduate School, 1964.
- JACKSON, Jessie H., Graduate Assistant in Education  
B.S., D. C. Teachers College, 1935; M.A., Columbia University, 1939.
- JACOBS, Linda W., Faculty Research Assistant in Special Education  
B.A., University of Maryland, 1962; M.A., 1965.
- JACOBS, Stanley, Graduate Assistant in Education  
B.S., State University College, Oswego, 1964.

## FACULTY

- JAMES, Richard L., Graduate Assistant in Education, Department of Secondary Education  
B.S., Hampton Institute, 1949; M.Ed., University of Michigan, 1951.
- JENKINS, John E., Graduate Assistant in Education  
B.A., Richmond College, June 1958; M.Ed., College of William and Mary, 1965.
- JONES, Casey, Grant Foundation Fellow, Institute for Child Study  
B.S., Winston-Salem State College, 1955; M.Ed., University of Maryland, 1963.
- KALLMYER, Carl B., Graduate Fellow in Education  
B.S., State Teachers College, Frostburg, Maryland, 1951.
- KIRBY, William H., NDEA Fellow and Graduate Assistant in Education (part-time)  
B.S., Towson State College, 1961.
- KOLB, John, Research Assistant, Department of Secondary Education  
B.A., University of Maryland, 1961.
- KRAUS, Charlotte W., Fellow in Special Education  
R.N., Garfield Memorial Hospital, 1941.
- KUO, You Yuh, Grant Foundation Fellow, Institute for Child Study  
B.S., Taiwan Normal University, 1956; M.A., National Chongchi Education, 1958; M.Ed., University of Maryland, 1963.
- LANDAU, Melanie, Graduate Assistant in Education, Department of Secondary Education  
B.A., Tulane University, 1962.
- LASLEY, Patterson O., Graduate Assistant in Education  
B.S., Elizabeth City State College, 1964; M.Ed., University of Maryland, 1965.
- LAY, Morris E., Research Assistant in Education, Department of Industrial Education  
B.S., West Virginia Institute of Technology, 1959.
- LOVE, Robert A., NDEA Fellow in Education  
B.S., University of Maryland, 1960.
- LOVELESS, Edna M., NDEA Fellow in Education  
B.A., Walla Walla College, 1950.
- MARTUZA, Victor R., NDEA Fellow and Graduate Assistant in Education (part-time)  
A.B., Wilkes College, 1958.
- McMILLAN, Joanne, NDEA Fellow in Education  
B.S., Cornell University, 1956; M.S., State University of New York, 1962.
- MELLO, Betty W., Fellow in Special Education  
B.S., Morgan State College, 1956.
- MESTANUS, Gregory S., Graduate Assistant, Interprofessional Research Commission on Pupil Personnel Service  
B.A., American University of Beirut, 1963; M.S., C. W. Post College of Long Island University, 1964.

## FACULTY

- METZ, John F.**, Graduate Assistant in Education  
B.A., University of Maryland, 1960.
- MILLER, Robert P.**, Graduate Assistant in Education, Department of Secondary Education  
B.S., Madison College, Virginia, 1959; M.S., 1961.
- MILLHAM, Paul M.**, NDEA Fellow in Education  
B.S., Pennsylvania State University, 1958; M.Ed., 1961.
- MILLS, David W.**, Research Assistant in Education, Department of Industrial Education  
B.S., Millersville State College, 1963; M.Ed., Ohio University, 1965.
- MYERS, Judith G.**, Fellow in Special Education  
A.B., Salem College, 1964.
- OROSZ, Gerald C.**, Graduate Assistant in Education  
B.S., University of Notre Dame, 1942; M.S., 1947.
- ORTIZ-COTTO, Pablo**, Graduate Assistant in Education  
B.A., University of Puerto Rico, 1951; M.A., Columbia University, 1956.
- O'SHAUGHNESSY, Gerald**, Graduate Assistant in Education, Department of Secondary Education  
B.S., University of Michigan, 1963.
- PERINE, James L.**, Grant Foundation Fellow, Institute for Child Study  
A.B., Northeast Missouri State Teachers College, 1964.
- PLASKON, Charles L.**, Graduate Assistant in Education, Department of Industrial Education  
B.A., Newark State College, Union, N. J., 1965.
- POLING, Donald A.**, Graduate Assistant in Education, Department of Secondary Education  
B.S., State Teachers College, Indiana, Pennsylvania, 1962.
- REIGHARD, Gary W.**, Graduate Assistant, Interprofessional Research Commission on Pupil Personnel Services  
B.S., State Teachers College, California, Pennsylvania, 1959; M.Ed., Temple University, 1962.
- RHOADS, Philip A.**, Graduate Assistant in Education  
B.S., State Teachers College at Towson, 1951; M.Ed., University of Maryland, 1957.
- RICHARDS, Kenvyn B.**, Graduate Assistant in Education, Department of Industrial Education  
B.S., Oswego, 1949; M.S., State University College, Oswego, 1953.
- RUBEN, Ruth A.**, Fellow in Special Education  
B.S., Goucher College, 1954.

## FACULTY

- SAMORAJCZYK, John F.**, Graduate Assistant in Education, Curriculum Laboratory  
B.A., Louisiana State, 1959; M.A., 1961.
- SEAMON, Kenneth B.**, Graduate Assistant in Education, Department of Industrial Education  
B.S., Ed., State College at Fitchburg, Mass., 1964.
- SIMENSEN, Richard J.**, Fellow in Special Education  
B.A., Keene State College, 1961.
- SMITH, Carroll W.**, Graduate Assistant in Education, Department of Industrial Education  
B.S., Clemson University, Clemson, S. C., 1954; M.A., N. C. State University, Raleigh, N. C., 1960.
- SPAHR, Richard D.**, Research Assistant in Education, Department of Industrial Education  
B.S., Purdue University, 1965.
- TANENBAUM, Elaine**, Graduate Assistant in Education, Department of Secondary Education  
B.A., University of Maryland, 1951; A.M., George Washington University, 1953.
- TAYLOR, Robert E.**, Grant Foundation Fellow, Institute for Child Study  
B.A., State University of Iowa, 1958; M.A., University of Alabama, 1960.
- THIRKILL, Evelyn A.**, Graduate Assistant in Education, Department of Early Childhood-Elementary Education  
B.S., Ricks College, 1955; M.S., Utah State University, 1956.
- VAN BRUNT, John E.**, Graduate Assistant in Education  
B.A., Fairleigh Dickinson University, 1965.
- VAN DONGEM, Barbara C.**, Graduate Assistant in Education  
B.A., Stanford University, 1963.
- WARD, Martha P.**, Graduate Assistant in Education, Curriculum Laboratory  
B.S., University of Dayton, 1962.
- WATERS, Mary D.**, Fellow in Special Education  
B.S., Coppin State College, 1965.







CATALOG OF THE  
COLLEGE  
OF  
ENGINEERING  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*September 24, 1966*

*Number 6*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Published twenty-nine times. Re-entered as second class mail matter under the Act of Congress on August 24, 1912, and second class postage paid at College Park, Maryland.



# Contents

## GENERAL

University Calendar .....	v	Expenses .....	3
Board of Regents .....	vi	Air Science Instruction .....	4
Officers of the University .....	vii	Libraries .....	4
Standing Committees, Faculty Senate .....	xi	General Facilities .....	5
The College .....	1	Scholarships and Grants-in-Aid .....	5
General Information .....	1	Honors and Awards .....	5
Admission Requirements ..	2	Professional and Honor Societies .....	6
Application Information ..	2	Graduate Study .....	6
Adventure in Learning .....	3		

## CURRICULA AND REQUIRED COURSES

Structure of Engineering		Electrical Engineering .....	16
Curricula .....	8	Mechanical Engineering .....	19
Supplemental Notes .....	8	Fire Protection .....	21
General Education Requirements .....	9	Cognate Activities .....	23
Basic and Alternate Curricula for Freshmen in Engineering	10	Institute for Fluid Dynamics and Applied Mathematics	23
Aerospace Engineering .....	11	Wind Tunnel Operations ..	24
Chemical Engineering .....	12	Fire Service Extension Department .....	24
Civil Engineering .....	14	Other Research Laboratories	25

## COURSE OFFERINGS

Aeronautical Engineering .....	26	Engineering Sciences .....	54
Chemical Engineering .....	29	Mechanical Engineering .....	55
Civil Engineering .....	37	Fire Protection .....	63
Electrical Engineering .....	44		
The Faculty .....			64



# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

- 12-16 Monday-Friday—Fall Semester Registration
- 19 Monday—Instruction begins

### NOVEMBER

- 23 Wednesday, after last class—Thanksgiving recess begins
- 28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

- 21 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Tuesday, 8:00 A. M.—Christmas recess ends
- 16 Monday—Pre-exam Study Day
- 17-24 Tuesday-Tuesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

- 30-Feb. 3 Monday-Friday—Spring Semester Registration

### FEBRUARY

- 6 Monday—Instruction begins
- 22 Wednesday—Washington's Birthday, holiday

### MARCH

- 23 Thursday, after last class—Easter recess begins
- 28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

- 10 Wednesday—AFROTC Day
- 24 Wednesday—Pre-exam Study Day
- 25-June 2 Thursday-Friday—Spring Semester Examinations
- 30 Tuesday—Memorial Day, holiday

### JUNE

- 3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

- 26-27 Monday-Tuesday—Registration, Summer Session
- 28 Wednesday—Instruction begins

### JULY

- 4 Tuesday—Independence Day, holiday
- 8 Saturday—Classes (Tuesday schedule)

### AUGUST

- 18 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

- 12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

- 7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

- 5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

HON. MARY ARABIAN

*Municipal Court of Baltimore City, Baltimore 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

# Officers Of The University

## *Central Administrative Officers*

### **PRESIDENT**

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### **VICE PRESIDENT, BALTIMORE CAMPUSES**

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### **VICE PRESIDENT FOR ACADEMIC AFFAIRS**

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### **VICE PRESIDENT FOR ADMINISTRATIVE AFFAIRS**

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### **ASSISTANT TO THE PRESIDENT**

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### **ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS**

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### **ASSISTANT, PRESIDENT'S OFFICE, RESEARCH**

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### **ASSISTANT, PRESIDENT'S OFFICE**

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### **DIRECTOR OF FINANCE AND BUSINESS**

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### **ASSISTANT DIRECTOR OF FINANCE AND BUSINESS**

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### **COMPTROLLER AND BUDGET OFFICER**

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### **DIRECTOR OF ADMISSIONS AND REGISTRATIONS**

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### **ASSOCIATE DIRECTOR AND REGISTRAR**

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### **DIRECTOR OF ALUMNI AFFAIRS**

J. Logan Schultz—*B.S., University of Maryland, 1938; M.S., 1940.*

#### DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

#### DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

#### ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

#### DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

#### ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

### *Emeriti*

#### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

#### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

#### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

#### PROFESSOR EMERITUS

Russell Bennett Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

### *Deans of the Schools and Colleges*

#### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

#### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

#### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

#### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

#### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

#### DEAN OF THE COLLEGE OF ENGINEERING

Robert B. Beckmann—*B.S., University of Illinois, 1940; Ph.D., University of Wisconsin, 1944.*

#### DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY

Homer W. Schamp, Jr.—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

#### DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1926; *Ph.D.*, *Columbia University*, 1931.

#### ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, *University of Maryland*, 1936.

#### DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

#### DEAN OF THE SCHOOL OF LIBRARY AND INFORMATION SERVICES

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

#### DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

#### DEAN OF THE SCHOOL OF NURSING

Marion Murphy—*B.S.*, *University of Minnesota*, 1936; *M.P.H.*, *University of Michigan*, 1946; *Ph.D.*, 1959.

#### DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

#### DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

#### DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

#### DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

### *Directors of Educational Services and Programs*

#### EXECUTIVE DEAN FOR STUDENT LIFE

Leslie R. Bundgaard—*B.S.*, *University of Wisconsin*, 1948; *M.S.*, 1949; *Ph.D.*, *Georgetown University*, 1954.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### DIRECTOR, COMPUTER SCIENCE CENTER

William F. Atchison—*A.B., Georgetown College, 1938; M.A., University of Kentucky, 1940; Ph.D., University of Illinois, 1943.*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF UNIVERSITY HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

#### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

FOUR-YEAR PROGRAMS OUTLINED IN THIS CATALOG LEAD TO THE DEGREE of Bachelor of Science and Bachelor of Science with curriculum designation in aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering, and fire protection. The engineering programs integrate these elements: (1) *basic sciences* including mathematics, physics, chemistry; (2) *engineering sciences* including mechanics of solids and fluids, engineering materials, thermodynamics, electricity and magnetism; (3) *professional studies* in aerospace, chemical, civil, electrical or mechanical engineering; (4) *liberal arts and social studies* in the General Education Program; and (5) certain other required subjects including health and physical activities.

## GENERAL INFORMATION

Each program lays a broad base for *continued learning* after college in professional practice, in business or industry, in public service, or in graduate study and research. Representative work that engineering graduates do is suggested in the following paragraphs.

The aerospace engineer deals with problems related to transporting people and things by air and through space. Aerodynamics, thermodynamics, and the mechanics of fluids and solids are among his basic sciences. He may apply them in some phase of planning or producing airplanes, missiles, or rockets, or in devising means to sustain and control their flight.

The chemical engineer applies chemistry to development and economic production of industrial chemicals, fuels, modern synthesis and certain alloys. He also applies mechanics, thermodynamics, reaction kinetics and aspects of nuclear science in unit operations and processes which are fundamental in the design and operation of industries in which material undergoes a change in its identity. He serves as a research worker, operator, manager, executive or consultant.

The civil engineer is primarily a planner, a designer, a builder, and a manager of public works and private enterprise. His professional service plays a major role in designing, supervising construction, or managing virtually every large building, bridge, dam, highway, railway, airport, water supply, waste disposal system, city plan, industrial plant, public works project.

The electrical engineer puts mathematics and the physical sciences to practical use in designing systems that generate, transmit and distribute electrical energy to transmit and receive "intelligence," as for example by telephone, radio, radar, television and computers; and to regulate and control mechanical and industrial processes by electronics and servomechanisms.

## GENERAL INFORMATION

The mechanical engineer figures ways to transmit power economically by heat or by mechanical systems. He applies the mechanics of fluids and solids, thermodynamics, and an understanding of the behavior of engineering materials under different conditions. As a professional engineer he devises processes for industrial production. As an industrial agent he serves as a supervisor, manager, or sales representative.

The specialist in fire protection is concerned with scientific, technical, and supervisory problems involved in safeguarding life and property from loss due to fire, explosion, and related hazards.

### *Admission Requirements*

Young men and women who wish to become *professional engineers* should enroll in an *academic* program in high school. A good academic record in high school is a basic requirement. Subjects that are recommended for admission are these:

Subjects	Recommended
English	4 units
Mathematics (college preparatory)—including algebra, plane geometry, and trigonometry, or other advanced mathematics	4
History and social sciences	2
Physical sciences	2
Foreign language (German, French or Russian preferred)	2
Unspecified academic subjects or suitable electives	2
Total	16

A complete statement of admission requirements and policies will be found in *An Adventure in Learning*. Application for admission should be made to the Director of Admissions, University of Maryland, College Park, Maryland.

### *Application Information*

**FALL SEMESTER:** All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before June 1. Any student registering for nine (9) or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between June 1 and July 15. Applicants for full-time attendance filing after June 1 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be

received by the appropriate University office by August 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by September 1.

**SPRING SEMESTER:** The deadline for the receipt of applications for the Spring Semester is January 1.

**GRADUATE SCHOOL:** Application for admission to the Graduate School must be made by September 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline is generally June 1.

### *Adventure in Learning*

All freshmen in the College of Engineering enroll in essentially the same subjects as detailed in this catalog.

Each student will select his major-line department before he begins his sophomore year's work. Thereafter he will pursue the approved program of his department which leads to the bachelor's degree.

Advanced students who show promise of creativity and leadership in engineering, in the engineering sciences, and in teaching and research, are encouraged to continue in a program of graduate study leading to master's and doctor's degrees. Able men and women *with ability* will find challenging opportunities if they have such top-level preparation. The best time to plan and to begin preparing for these top-level opportunities is while one is in high school. Parents and teachers can help by leading, by pointing ways, and by maintaining proper standards of performance and conduct. But the lifelong *adventure in learning*, which is the true characteristic of the well-educated man or woman, demands systematic mental exercise throughout life. "Chance favors the prepared mind!"

### *Expenses*

Annual expenses of attending the University are approximately as follows: \$270.00 fixed charges, \$96.00 special fees, \$440.00 board; \$320.00 lodging for Maryland residents, or \$420.00 for residents of other states and countries. A matriculation fee of \$10.00 is charged all new students and is payable only once. A fee of \$10.00 must accompany a prospective student's application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee. A charge of \$400.00 (\$200.00 a semester) is assessed to all students who are non-residents of the State of Maryland. Students who are minors are considered to be resident students if at the time of their registration their parents have been domiciled in the State of Maryland for at least six months.

## GENERAL INFORMATION

The status of the residence of a student is determined at the time of his first registration in the University and may not thereafter be changed by him unless, in the case of a minor, his parents move to and become legal residents of Maryland by maintaining such residence for at least six months. However, the right of the minor student to change from a non-resident status to resident status must be established by him prior to the registration period set for any semester.

Adult students are considered to be residents if at the time of their registration they have been domiciled in Maryland for at least six months provided such residence has not been acquired while attending any school or college in Maryland or elsewhere. Time spent on active duty in the armed services while stationed in Maryland will not be considered as satisfying the six-months period referred to above except in those cases in which the adult was domiciled in Maryland for at least six months prior to his entrance into the armed service and was not enrolled in any school during that period.

The word "domicile" as used in this regulation shall mean the permanent place of abode. For the purpose of this rule only one domicile may be maintained.

*An Adventure in Learning*, a bulletin which serves as a guide to the undergraduate programs of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park.

### *Air Science Instruction*

The University of Maryland operates one of the largest Air Force Reserve Officer Training Units in the United States. ROTC is offered on a completely elective basis. Its curriculum is generalized, consisting of courses designed to produce citizens and officers with well-rounded backgrounds.

The University offers incoming students a choice of a two-year or a four-year program. Successful completion of either program qualifies the student for a commission in the Air Force upon graduation. For further details concerning Air Science, refer to *An Adventure in Learning* bulletin.

### *Libraries*

The libraries of the University are located on both the College Park and Baltimore campuses. They include the Theodore R. McKeldin Library and the many college and departmental libraries which house special collections. Because of the location of the University the large libraries of Baltimore and Washington are a valuable asset to graduate work. Arrangements can be made for personal work in the Enoch Pratt Library of Baltimore, the Library of Congress, the United States Department of

Agriculture Library and the many fine collections of other government agencies in Washington.

Located in a geographical area rich in library resources, the University's libraries are well equipped to serve the engineering programs of study and research. The Engineering and Physical Sciences Library which supplements the Science and Technology Division of the general University Library is in the north wing of the Mathematics Building. This Library has a reading room on the first floor and three decks of book stacks above with a capacity of over 100,000 volumes. Stacks are open to all students. A building extension to be completed by the fall of 1967 will triple the reading and study (carrels and conference rooms) space and increase the stack capacity to over 200,000 volumes. Microfilm and micro-card readers and complete photocopying service are available.

The Library collection covers the fields of engineering, mathematics, physics and industrial education. Its journal holdings represent over a thousand titles in science and technology; more than eight hundred are currently received. Several personal libraries of outstanding scientists and engineers have been acquired by the Library, the most extensive being the private collections of Max Born and Richard Von Mises. The Library is a designated depository of U.S. Atomic Energy Commission unclassified reports, including those of atomic energy establishments of Great Britain, Canada and other nations. Inter-library loan agreements assure the receipt of special materials from other libraries throughout the country.

### *General Facilities*

The College of Engineering, and departments in other colleges of the University, are well equipped for instruction and basic research in their respective areas of activity. There is excellent interdepartmental cooperation in furthering studies of mutual interest.

### *Scholarships and Grants-in-Aid*

Scholarships and grants-in-aid are awarded each year to selected students in the College of Engineering. A list of such awards is published in the University publication *An Adventure in Learning*. Applications should be filed on forms which may be obtained from the Director, Office of Scholarships and Grants-in-Aid, University of Maryland, College Park, Maryland.

### *Honors and Awards*

The College of Engineering schedules annually in the Spring an *Honors Day Convocation* to direct public attention to students and faculty who have distinguished themselves by scholarship and worthy activities. Families and friends of honorees, sponsors of scholarships and awards, alumni, and others interested in the University are cordially invited to this convocation.

## GENERAL INFORMATION

### *Professional and Honor Societies*

Student branches of the following national engineering societies are established in the College of Engineering: American Institute of Aeronautics and Astronautics, American Institute of Chemical Engineers, American Society of Civil Engineers, Institute of Electrical and Electronics Engineers, American Society of Mechanical Engineers, and National Society of Fire Protection Engineers.

Each student is urged to be active in his engineering society. At meetings of professional societies he will meet distinguished engineers representing science, industry, practice, and public service. In discussions of scientific and engineering subjects he can learn to think for himself and to speak effectively. In teams and committees he can learn to work effectively with others. Indeed, it pays a student to be active in his student branch as it pays a graduate engineer to be active in his national engineering society.

Engineering students are encouraged to attend meetings of local sections of their professional and scientific societies in nearby Baltimore and Washington, to get acquainted with other men in their fields, and to visit nearby industries, public works, libraries and laboratories.

The following national honorary societies of particular interest to students in engineering and related sciences have active chapters at the University of Maryland: Tau Beta Pi, general engineering; Sigma Xi, scientific research; Phi Kappa Phi, senior scholarship; Eta Kappa Nu, electrical engineering; Pi Tau Sigma, mechanical engineering; Chi Epsilon, civil engineering.

### *Graduate Study*

An applicant for admission to the Graduate School must hold a bachelor's or a master's degree from a college or university of recognized standing. The applicant shall furnish an official transcript of his collegiate record which for unconditional admission must show credible completion of an adequate amount of undergraduate preparation of high quality for graduate work in his chosen field.

Application for admission to the Graduate School should be made not later than August 1 for the fall term and January 1 for the spring term on blanks obtained from the office of the Dean of the Graduate School, University of Maryland, College Park, Maryland. Information on graduate work is published in the Graduate School Announcements.

Graduate Assistantships and Research Assistantships with stipends for service, and Fellowships, are sometimes available for study and research in the several departments of the College of Engineering. Only full-time students who have been admitted to the Graduate School are eligible for appointment. Preference is given to graduate students who are American citizens in view of limitations of available funds. Foreign students

## GENERAL INFORMATION

may be considered for vacancies after they have completed at least one year of full-time graduate study in residence at the University of Maryland. Letters of application for assistantships or fellowships should be directed to the head of the student's major department in the College of Engineering.

### *For Additional Information*

A detailed explanation of the regulations of student and academic life may be found in the University publication entitled *University General and Academic Regulations*.

# Required Courses

## STRUCTURE OF ENGINEERING CURRICULA

COURSES IN THE NORMAL CURRICULUM OR PROGRAM AND PRESCRIBED credit hours leading to the degree Bachelor of Science (with curriculum designation) are outlined on the following pages for each department in the College of Engineering. "...No student may modify the prescribed number of hours without special permission from the dean of his college." The courses in each curriculum may be classified in the following categories:

1. Certain courses required of all undergraduate students in the University. Students who are not specifically exempted are required to register in and successfully complete two prescribed courses in physical education for a total of two semester hours of credit. A health course (2 credits) is also required of all undergraduate men and women.
2. Courses in the General Education Program. These include: English (9 credits), Fine Arts or Philosophy (3 credits), History (6 credits), and Social Science (6 credits). A listing of specific courses which meet the requirements of the General Education Program are listed below.
3. Courses in the physical sciences—mathematics, chemistry, physics.
4. Collateral engineering courses—engineering sciences, and other courses approved for one curriculum but offered by another department.
5. Courses in the major department.

A student should obtain written approval for any substitution of courses from the department head and the dean of his college.

The courses in each engineering curriculum, as classified above, form a sequential and developmental pattern in subject matter. In this respect, curricula in engineering may differ from curricula in other colleges. Some regulations which are generally applicable to all students (see *University General and Academic Regulations*) may need clarification for purposes of orderly administration among engineering students. Moreover, the College of Engineering establishes policies which supplement the University Regulations.

## SUPPLEMENTAL NOTES

1. The responsibility for proper registration and for satisfying stated prerequisites for any course must rest with the student—as does the responsibility for proper achievement in courses in which he is enrolled. Each student should be familiar with the provisions of this catalog, *University General and Academic Regulations*, and other pertinent regulations.
2. A student who is enrolled for more than 8 semester-hours of work must register for physical education each semester until he has fully satis-

## STRUCTURE OF ENGINEERING CURRICULA

fied the University's requirement. He should schedule the required two credits of Health during his first thirty credits of registration in the University.

3. Required courses in mathematics, physics, and chemistry have highest priority; and every engineering student must register for mathematics and chemistry—or mathematics and physics—until he has fully satisfied requirements of the College of Engineering in these subjects. Courses in mathematics, chemistry and physics may not be dropped.

4. A student is advised to schedule a reduced load if his record of scholarship during the previous semester was unsatisfactory (a) because he failed courses, or (b) because his average during the previous semester was less than 2.0 ("C"). A student who is on probation may not schedule more than 16 semester-hours of work in any semester, *including* credit for physical education and military science. However, he may not defer the top-priority subjects noted in Paragraphs 2 and 3 above without written approval of the Dean.

5. A student in the College of Engineering has attained junior standing when he has completed a minimum of 56 academic hours toward his degree, including Math. 22 and Phys. 21 and possessing the minimum required grade point average to remain in the University.

6. As indicated in *University General and Academic Regulations* a student who has not attained Junior Standing may not register for upper division courses.

7. To be eligible for a bachelor's degree in the College of Engineering, a student must have an *average* of at least "C" = 2.0—(a) in all subjects applicable to his degree, and (b) in all junior-senior courses in his major department. Responsibility for knowing and meeting all degree requirements for graduation in any curriculum rests with the student.

## GENERAL EDUCATION REQUIREMENTS

In order that each graduate with a bachelor's degree may gain a liberal education as well as a specialized one, the University has established a General Education Requirement. This requirement consists of 34 credits in six general fields. Students in the College of Engineering automatically satisfy the ten credits required in Mathematics and Science fields through required courses in the Engineering curricula. General Education requirements in the other four fields are as follows:

- (1) English (9 hours): Eng. 1, 3 and 4.
- (2) Fine Arts or Philosophy (3 hours): Art 10, 60, 61, 65, 67, 68, 70, 71 or 80; Dance 32, 182 or 184; Music 20; Speech 16 or 114; or Philosophy 1, 41, 45, 52, 53, 147, 152 or 154.

## BASIC ENGINEERING CURRICULUM

- (3) History (6 hours): United States History—Hist. 21, 22, 23, 24 or 29; non-United States History—Hist. 31, 32, 41, 42, 51, 52, 53, 54, 61, 62, 71 or 72.
- (4) Social Science (6 hours): Anthropology; Economics 31 or 37; Government and Politics 1; Psychology 1; or Sociology 1.

## BASIC AND ALTERNATE CURRICULA FOR FRESHMEN IN ENGINEERING

Students who *are* prepared to schedule Math. 19 (as indicated by results of the University's classification test) schedule the following *Basic Curriculum for Freshmen*:

FRESHMAN YEAR (BASIC)	Semester	
	I	II
Math. 19—Elementary Analysis .....	4	..
Math. 20—Calculus I .....	..	4
Chem. 1, 3—General Chemistry .....	4	4
EN ES 1—Introductory Engineering Science .....	4	..
EN ES 10—Mechanics .....	..	4
General Education Courses .....	3	3
Health 5—Science and Theory of Health .....	..	2
Physical Activities .....	1	1
Total .....	16	18

Students who are *not* prepared to schedule Math. 19 (as indicated by results of the University's classification test) are *advised* to schedule Math. 18 and Eng. 1 in the Summer Session *before* the fall (first) semester. Otherwise they will schedule courses in the *Alternate Curriculum for Freshmen* in the following sequence:

FRESHMAN YEAR PLUS SUMMER (ALTERNATE)	Semester		Summer
	I	II	III
Math. 18—Introductory Analysis* .....	3	..	..
Math. 19—Elementary Analysis .....	..	4	..
Math. 20—Calculus I .....	..	..	4
Chem. 1, 3—General Chemistry .....	4	4	..
General Education Courses .....	6	3	..
EN ES 1—Introductory Engineering Science ..	..	4	..
EN ES 10—Mechanics .....	..	..	4
Health 5—Science and Theory of Health .....	2	..	..
Physical Activities .....	1	1	..
Total .....	16	16	8

\*Math 18 is an *additional* course for students who do not qualify to register for Math 19.

## AEROSPACE ENGINEERING

Aerospace engineering involves the application of the laws of physics and mathematics to the problems of flight through the earth's atmosphere and outer space. The main sub-divisions of the field are aerodynamics, structures, and propulsion, although many problems, such as those of aeroelasticity and flutter, cut across dividing lines. The aerodynamicist must start out with an understanding of the laws of fluid flow at low speed, then modify these principles for the effects of higher speeds. At supersonic speeds, he must account for shock waves in flight at moderate altitudes and further changes in the flow at extremely high altitudes. At extremely high speeds he must add to this an understanding of the effects of ionization and molecular dissociation. The structures engineer is mainly concerned with the ability of the vehicle to withstand the forces and accelerations in flight. For high performance aircraft and missiles, he must consider the aerodynamic heating resulting from high-speed flight and allow for the weakening effect on materials. The propulsion engineer must deal with rocket, jet, or propellor systems which serve to accelerate the vehicle and to offset drag forces during flight.

The aerospace engineer is continually beset with the problems of maintaining adequate margins of safety with a minimum of weight. The saving of even one pound of weight in fuel or structure of a missile is of such value as to justify the expenditure of many man-hours. These high dividends for thoroughness and precision in technical understanding are a source of gratification to the aerospace engineer.

## AEROSPACE ENGINEERING CURRICULUM

SOPHOMORE YEAR	Semester	
	I	II
Math. 21, 22—Calculus II, III.....	4	4
Phys. 20, 21—General Physics.....	5	5
EN ES 20—Mechanics of Materials.....		3
EN ES 21—Dynamics .....	3	..
EN ME 1—Thermodynamics I .....	..	3
General Education Courses .....	3	3
Total.....	15	18

## CHEMICAL ENGINEERING CURRICULUM

	<i>Semester</i>	
	<i>I</i>	<i>II</i>
<b>JUNIOR YEAR</b>		
Eng. 3, 4—Composition and World Literature . . . . .	3	3
EN AE 101—Aerodynamics I . . . . .	3	..
EN AE 102—Aerodynamics II . . . . .	..	2
EN AE 109—Flight Propulsion . . . . .	..	3
EN AE 113—Flight Structures . . . . .	..	4
EN ES 30—Materials Science . . . . .	3	..
EN ME 106—Transfer Processes . . . . .	3	..
EN ME 140—Engineering Analysis and Computer programming . . . . .	..	3
Math. 66—Differential Equations for Engineers . . . . .	3	..
E. E. 51, 52—Principles of Electrical Engineering . . . . .	4	4
Total . . . . .	19	19
<b>SENIOR YEAR</b>		
General Education Courses . . . . .	3	3
Technical Elective . . . . .	..	3
EN AE 107, 108—Aerospace Design . . . . .	4	4
EN AE 110—Flight Propulsion . . . . .	3	..
EN AE 111, 112—Electric Research . . . . .	2	2
EN AE 114—Flight Structures . . . . .	3	..
EN AE 115—Aerodynamics III . . . . .	3	..
EN AE 117—Aircraft Vibrations . . . . .	..	3
EN AE 118—Dynamics of Aerospace Vehicles . . . . .	..	3
Total . . . . .	18	18

## CHEMICAL ENGINEERING

Chemical engineering involves the application of sound engineering and economic principles—and basic sciences of mathematics, physics, and chemistry—to process industries concerned with the chemical transformation of matter. The chemical engineer is primarily concerned with research and process development leading to new chemical process ventures or a better understanding of existing ones; with the efficient operation of the complete chemical plant or its component units; with the technical service engineering required for improving and understanding chemical plant operation and the products produced; with the chemical sales and economic distribution of the chemical plant product; and with the general management and executive direction of chemical process industry plants and industrial complexes.

Because of this wide range of ultimate application, the chemical engineer finds interesting and diverse career opportunities in such varied fields as chemical (inorganic and organic), food processing and manufacture, metallurgical, nuclear and energy conversion, petroleum (refining, production, or petrochemical), and pharmaceutical industries. Additional

## CHEMICAL ENGINEERING CURRICULUM

opportunities are presented by the research and development activities of many public and private research Institutes and allied agencies.

The chemical engineering department offers a curriculum to prepare the undergraduate for a challenging career in any of the aforementioned fields of interest—a curriculum that will prepare him for continued graduate study or immediate industrial employment following the baccalaureate degree.

### CHEMICAL ENGINEERING CURRICULUM

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Math. 21, 22—Calculus II, III . . . . .	4	4
Phys. 20, 21—General Physics . . . . .	5	5
Chem. 17—Principles of Solution Chemistry . . . . .	2	..
Chem. 23—Inorganic Structures and Chemical Bonding . . . . .	..	2
EN CH 15—Chemical Engineering Analysis . . . . .	2	..
EN CH 50—Engineering Thermodynamics . . . . .	..	3
Econ. 37—Fundamentals of Economics . . . . .	..	3
EN ES 20—Mechanics of Materials . . . . .	3	..
Total . . . . .	16	17
<b>JUNIOR YEAR</b>		
General Education Courses . . . . .	3	3
Chem. 35, 37—Elementary Organic Chemistry . . . . .	2	2
Chem. 36—Elementary Organic Laboratory . . . . .	2	..
Chem. 187, 189—Physical Chemistry . . . . .	3	3
Chem. 188, 190—Physical Chemistry Laboratory . . . . .	2	2
EN CH 116—Applied Mathematics in Chemical Engineering . . . . .	..	3
EN ES 30—Materials Science . . . . .	..	3
EN CH 109—Chemical Process Thermodynamics . . . . .	3	..
EN CH 127, 129—Transfer and Transport Processes I, II . . . . .	4	3
Total . . . . .	19	19

## CIVIL ENGINEERING CURRICULUM

SENIOR YEAR	Semester	
	I	II
General Education Courses *	3	6
EN EE 60—Principles of Electrical Engineering . . . . .	3	..
EN EE 61—Electrical Engineering Laboratory . . . . .	1	..
EN CH 131—Transfer and Transport Processes III . . . . .	3	..
EN CH 133, 134—Seminar . . . . .	1	1
EN CH 137—Chemical Engineering Laboratory* . . . . .	3	..
EN CH 145—Chemical Engineering Kinetics . . . . .	2	..
EN CH 147—Process Engineering and Design* . . . . .	..	3
EN CH 149—Chemical Engineering Economics . . . . .	..	2
EN CH—Technical Electives** . . . . .	3	5
Total . . . . .	19	17

\* Courses which may be scheduled either semester of the senior year.

\*\* A minimum of 5 credits will be required in chemical engineering electives.

The following courses are available as technical electives: EN CH 140, EN CH 142, EN CH 148, EN CH 150, EN CH 152, EN CH 154, EN CH 155, EN CH 157, EN CH 159, EN CH 165, EN CH 170, EN CH 171, EN CH 172, and EN CH 173.

## CIVIL ENGINEERING

Civil engineering is the professional hub of the construction and transportation industries which together are perhaps the largest and most diversified industries in America.

Professional civil engineers plan, design, and supervise construction of virtually every large enterprise involving construction, transportation, industrial facilities, and public works. Having planned and supervised construction of a major project, civil engineers are often selected to direct its operation as managers or executives.

Civil engineers design structures such as bridges, buildings, dams, power plants, tunnels . . . They plan and direct the use of water for cities, industries, flood control, irrigation, power . . . They plan water treatment plants, sewerage systems, and waste disposal facilities and supervise their operation . . . They manage municipal and regional development projects, public works, and private enterprise of great variety.

The civil engineer may work primarily in the office; primarily in the field; or he may divide his duty between field and office. To accomplish his ends as a creative planner and designer, he must be proficient in adapting mathematics, the physical sciences, and materials of construction. He must have a working knowledge of men and of machines. He must be an alert observer, with an eye for significance. He must be fair and resourceful in handling men, competent in devising adequate and economical solutions to a *whole* problem, responsible in handling funds, and practical in getting a job done adequately and on time. Adequacy, safety, economy, resourcefulness, integrity, and a sense of fitness are important considerations in everything a civil engineer does.

## CIVIL ENGINEERING CURRICULUM

The foundations of professional engineering service are laid in college where in tackling a *project* the student learns to use mathematics and physical sciences; learns to communicate effectively in the *engineer's languages* of words, pictures, and numbers; learns to think and speak for himself; and learns to work in teams with others.

### CIVIL ENGINEERING CURRICULUM

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
General Education Courses . . . . .	3	3
Physics 20, 21—General Physics . . . . .	5	5
Math. 21, 22—Calculus I, II . . . . .	4	4
EN ES 20—Mechanics of Materials . . . . .	3	..
EN ES 21—Dynamics . . . . .	..	3
EN CE 50—Fundamentals of Engineering Materials . . . . .	3	..
EN CE 90—Engineering Survey Measurements . . . . .	..	3
<b>Total</b> . . . . .	<b>18</b>	<b>18</b>
<b>JUNIOR YEAR</b>		
Econ. 37—Fundamentals of Economics . . . . .	3	..
General Education Course . . . . .	..	3
EN CE 100—Numerical Analysis and Computer Program- ming . . . . .	..	3
EN CE 112—Applied Mathematics in Engineering . . . . .	3	..
EN ME 105—Principles of Mechanical Engineering . . . . .	3	..
EN CE 102—Fundamentals of Structural Analysis . . . . .	3	..
EN CE 103—Basic Structural Design . . . . .	..	3
EN CE 105—Basic Fluid Mechanics . . . . .	3	..
EN CE 106—Fundamentals of Sanitary Engineering . . . . .	..	3
EN CE 107—Basic Soil Mechanics . . . . .	..	3
EN CE 108—Fundamentals of Transportation Engineering . . . . .	3	..
EN EE 50—Fundamentals of Electrical Engineering . . . . .	..	3
<b>Total</b> . . . . .	<b>18</b>	<b>18</b>
<b>SENIOR YEAR</b>		
General Education Courses . . . . .	3	3
EN CE 104—Computer Analysis . . . . .	3	..
EN CE 109, 110—Basic Civil Engineering Planning . . . . .	2	1
Technical Electives (See Note B) . . . . .	6*	9*
Extra-Departmental Electives (See Note A) . . . . .	3	3
<b>Total</b> . . . . .	<b>17</b>	<b>16</b>

\* These numbers represent five three-semester-credit courses. Additional semester credits will be involved to the extent that courses carrying more than three credits are selected.

## ELECTRICAL ENGINEERING CURRICULUM

### NOTES CONCERNING ELECTIVES:

The student shall, with the assistance of his advisor, select a coherent program of electives in accordance with the following

- A. Six (6) elective credits (two courses) must be taken outside the Department. Three credits must be in a field related to economics, management or business law. The other three are at the choice of the student.
- B. Five technical elective courses (15-17 credits) must be taken as specified below:
  - (1) A two course sequence, in the order shown, must be taken from one of the following five:
    - (a) ENCE 125, 126
    - (b) ENCE 165, 166
    - (c) ENCE 175, 176
    - (d) ENCE 185, 186
    - (e) ENCE 135, 155
  - (2) Three courses may be selected from any listed in part B (1) above or from the following:
    - (a) ENCE 145
    - (b) ENCE 195
    - (c) ENCE 199
    - (d) ENCE 127
    - (e) or, with departmental approval, one of the three may be a suitable technical elective outside the department.

## ELECTRICAL ENGINEERING

Electrical engineering education is a good preparation for any of several careers—in research, development, design, production, sales, technical management, or teaching—within the broad area of the useful application of electrical and electronic phenomena. An increasing number of electrical engineering graduates has in recent years gone into such fields as electronic digital computers, systems analysis, automatic control, telemetry and space navigation, communications, and solid-state devices such as the transistor. Many other smaller fields have attracted graduates with particular interests and abilities, for example, instrumentation for medical research, electromechanical transducer design, design of particle accelerators and other machines and instrumentation for use in research in physics, microminiaturization of electronic component assemblies, or antenna design. Many other fields such as electric power generation and transmission, radio, and television offer satisfying careers to the electrical engineering graduate. Finally, many graduates leave the pro-

## ELECTRICAL ENGINEERING CURRICULUM

fession, carrying into other careers the knowledge and judgment acquired in their engineering education.

Increasingly, the boundary between electrical engineers and applied physicists or applied mathematicians becomes less distinct. The various branches of engineering similarly interact with each other, as technical problems become more sophisticated, and require a combined attack from several disciplines. The engineer occupies an intermediate position between science and the public, because, in addition to understanding the scientific principles of a situation, he is concerned with the timing, economics, and values that define the useful application of those principles.

In many cases, engineers have as a major duty the supervision of other engineers, and of technicians. Hence electrical engineering involves not only scientific knowledge but also the ability and judgment to work effectively and communicate easily with many other people. Clearly, the desirable attributes for success vary from one career choice to another within electrical engineering. The specialist in creative research and advanced development needs graduate work to the M.S. or Ph.D. degree. An engineering sales representative, however, would in most cases begin to acquire the needed detailed awareness of current practice by taking a job immediately after the B.S. degree.

In this context of electrical engineering as a broad and diverse field the goal of the Department is set—to provide an educational program and environment of challenge and adaptability, so that the graduate will be well prepared to enter any of the areas of electrical engineering for which he is suited. To this end, the B.S. program makes provision for several technical electives, and the graduate programs permit a variety of specialization. As in most endeavors the rewards to the student will be a measure of the effort expended, multiplied by a coefficient of effectiveness.

## ELECTRICAL ENGINEERING CURRICULUM

SOPHOMORE YEAR	Semester	
	I	II
Math. 21, 22—Calculus II, III .....	4	4
Phys. 20, 21—General Physics ..	5	5
EN ES 21—Dynamics .....	3	..
EN EE 80—Algorithmic Analysis and Computer Program- ming .....	2	
EN EE 83—Digital Computer Laboratory .....	..	1
EN EE 90—Circuit Analysis I .....	..	4
EN EE 91—Circuits Laboratory I .....	..	1
General Education Courses .....	3	3
Total .....	17	18

## ELECTRICAL ENGINEERING CURRICULUM

### JUNIOR YEAR

Math. 66—Differential Equations .....	3	..
EN ME 100—Thermodynamics .....	3	..
Phys. 153—Modern Physics for Engineers.....	..	3
EN EE 130, 132—Engineering Electromagnetics I, II.....	3	3
EN EE 120—Circuit Analysis II .....	4	..
EN EE 121—Circuits Laboratory II .....	-	..
EN EE 122—Electronic Circuits I.....	..	4
EN EE 123—Electronics Laboratory I.....	..	1
Technical Elective * .....	..	3
General Education Courses .....	3	3
<b>Total</b> .....	<b>17</b>	<b>17</b>

### SENIOR YEAR

EN EE 142—Engineering Probability.....	2	..
EN EE 134—Engineering Electromagnetics III.....	3	..
EN EE 140—Transducers and Electrical Machinery.....	..	3
EN EE 141—Transducers and Electrical Machinery Laboratory .....	..	1
EN EE 124—Electronic Circuits II.....	4	..
EN EE 125—Electronics Laboratory II.....	1	..
EN ME 107—Energy Conversion .....	..	3
Technical Electives * .....	4	7
General Education Courses .....	3	3
<b>Total</b> .....	<b>17</b>	<b>17</b>

\* Of the 14 technical elective credits listed in the curriculum, at least 3 credits must be in electrical engineering and at least 3 credits must be either from other fields of engineering, mathematics, physics, or other suitable scientific discipline. The student's elective program must be approved by his advisor. More than 14 credits may be taken.

Technical electives available in Electrical Engineering are described in the course listings later in this catalog. Any course numbered between ENEE 150 and ENEE 199 that is not specifically excluded in its description may be used as part of a technical elective program, with approval of the student's faculty adviser. Appropriate courses from other departments are encouraged as part of the technical elective program.

For students planning to continue in graduate work, technical electives should be selected to provide the best possible preparation for the probable areas of graduate specialization. The areas, and topics in which opportunities for graduate specialization and research are particularly favorable in Electrical Engineering at Maryland at this time are as follows:

### 1. ELECTROMAGNETICS AND PHYSICAL ELECTRONICS

- Radio Wave Propagation and Antennas
- Quantum Electronics; Lasers
- Electron and Ion Beams; Cyclotron Design

## MECHANICAL ENGINEERING CURRICULUM

- d. Semiconductor Device Properties and Characterization (Also part of Area 2)
- e. Electrical Engineering in Medicine and Biology (Also part of Area 2)

### 2. CIRCUITS AND CONTROL SYSTEMS

- a. Electronic Circuits and Systems
- b. Network Theory
- c. Continuous and Sampled-Data Control Systems

### 3. INFORMATION SCIENCES

- a. Computer Systems Design and Analysis
- b. Switching Theory
- c. Communication and Information Theory
- d. Mechanized Storage and Retrieval of Scientific Information.

## MECHANICAL ENGINEERING

The principal function of the mechanical engineer is to apply science and technology creatively to the design and manufacture of machines for the practical use of mankind. Any machine or manufactured product requires, basically, (1) the art and science of generating, transmitting, and utilizing mechanical power, and (2) research, development, designing, and the coordination of materials, personnel, and management. These basic requirements define mechanical engineering. The following *professional divisions* of the American Society of Mechanical Engineers give a good idea of types of work in which the mechanical engineer may become associated: applied mechanics, aviation, bio-engineering, materials handling, management, oil and gas power, fuels, safety, hydraulics, metals engineering, heat transfer, process industries, production, machine design, lubrication, petroleum, nuclear engineering, railroads, power, textile, gas turbine power, wood industries, rubber and plastics, and instruments and regulators.

Because of the wide variety of engineering opportunities available to the mechanical engineer, the curriculum is designed to give the student a thorough training in the basic sciences: physics, chemistry, mathematics, solid and fluid mechanics, dynamics, thermodynamics, heat transfer, materials, electricity, nuclear technology, power, and design.

There are opportunities for mechanical engineers in all manufacturing enterprises. There are opportunities in research, design, production, testing, maintenance, and sales. There are opportunities for engineers who can devise manufactured products that utilize power in any form for the convenience of man. There are opportunities wherever there are factories. Since every town of moderate size has factories, the mechanical engineer may select the community where he wishes to make his home and be reasonably certain that he can find satisfactory employment there.

## MECHANICAL ENGINEERING CURRICULUM

### MECHANICAL ENGINEERING CURRICULUM

	<i>(Semester)</i>	
	<i>I</i>	<i>II</i>
<b>SOPHOMORE YEAR</b>		
Math. 21, 22—Calculus II, III .....	4	4
Phys. 20, 21—General Physics .....	5	5
EN ES 20—Mechanics of Materials .....	3	..
EN ES 21—Dynamics .....	..	3
EN ME 1—Thermodynamics .....	..	3
General Education Courses .....	3	3
Total .....	15	18
<b>JUNIOR YEAR</b>		
General Education Courses .....	3	3
EN EE 60, 62—Principles of Electrical Engineering .....	3	3
EN EE 61, 63—Electrical Engineering Laboratory .....	1	1
EN ES 30—Materials Science .....	3	..
EN ME 101—Dynamics of Machinery .....	2	..
EN ME 102—Fluid Mechanics I .....	3	..
EN ME 103—Materials Engineering .....	..	3
EN ME 104—Gas Dynamics .....	..	3
EN ME 106—Transfer Processes .....	..	3
EN ME 120—Measurements Laboratory .....	..	2
Math. 66—Differential Equations for Engineers .....	3	..
or		
EN ME 116—Mathematics for Engineers .....	3	..
Total .....	18	18
<b>SENIOR YEAR</b>		
General Education Courses .....	3	3
EN ME 150, 151—Energy Conversion .....	4	3
EN ME 152—Machine Design .....	3	..
EN ME 154, 155—Engineering Experimentation .....	2	2
EN ME 156, 157—Mechanical Engineering Analysis and Design .....	3	4
Technical Elective .....	3	6
Total .....	18	18

## TECHNICAL ELECTIVES

EN ME 140—Engineering Analysis and Computer Programming .....	3	..
EN ME 153—Elasticity and Plasticity I.....	3	..
EN ME 162—Dynamics II .....	3	..
EN ME 164—Thermodynamics II .....	3	..
EN ME 166—Special Problems .....	3	..
EN ME 161—Environmental Engineering .....	3	..
EN ME 163—Fluid Mechanics II .....	3	..
EN ME 165—Automatic Controls .....	3	..
EN ME 167—Introduction to Operations Research I.....	3	..
EN ME 168—Solid State for Engineers I.....	3	..
EN ME 169—Solid State for Engineers II.....	3	..
EN ME 170—Structure and Properties of Engineering Materials .....	3	..

## FIRE PROTECTION

Fire protection is concerned with the scientific and technical problems of preventing loss of life and property from fire, explosion and related hazards, and of evaluating and eliminating hazardous conditions.

The fundamental principles of fire protection are relatively well defined and the application of these principles to a modern industrialized society has become a specialized activity. Control of the hazards in manufacturing processes calls for an understanding not only of measures for fire protection but of the processes themselves. Often the most effective solution to the problem of safeguarding a hazardous operation lies in the modification of the process rather than in the installation of special extinguishing equipment. The expert in fire protection must be prepared to decide in any given case what is the best and most economical solution of the fire prevention problem. His recommendations are often based not only on sound principles of fire protection but on a thorough understanding of the special problems of the individual property.

Modern fire protection utilizes a wide variety of mechanical and electrical equipment which the student must understand in principle before he can apply them to special problems. The fire protection curriculum emphasizes the scientific, technical and humanitarian aspects of fire protection, and the development of the individual student.

The problems and challenges which confront the specialist in fire protection include the reduction and control of fire hazards due to processes subject to fire or explosion in respect to design, installation and handling, involving both physical and human factors; the use of buildings and transportation facilities to restrict the spread of fire and to facilitate the escape of occupants in case of fire; the design, installation and maintenance of fire detection and extinguishing devices and systems; and the organization and education of persons for fire prevention and fire protection.

## AGRICULTURAL ENGINEERING

### FIRE PROTECTION CURRICULUM

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Math. 21, 22—Calculus II, III .....	4	4
Phys. 20, 21—General Physics .....	5	5
EN ES 20—Mechanics of Materials .....	..	3
EN ES 21—Dynamics .....	3	..
EN ME 1—Thermodynamics I .....	..	3
General Education Courses .....	3	3
Total .....	15	18
<b>JUNIOR YEAR</b>		
General Education Courses .....	3	3
EN ES 30—Materials Science .....	3	..
Econ. 37—Fundamentals of Economics .....	..	3
B. A. 191—Property Insurance .....	..	3
EN CE 105—Basic Fluid Mechanics .....	3	..
EN FP—104—Essentials of Fire Protection .....	3	..
EN FP 105—Fire Protection Organization .....	..	3
EN FP 110—Installations and Equipment .....	..	4
EN FP 120—Insurance Rating and Schedules .....	3	..
Approved Electives .....	3	3
Total .....	18	19
<b>SENIOR YEAR</b>		
General Education Courses .....	3	3
EN CH 106—Fundamentals of Sanitary Engineering .....	3	..
EN CH 142—Environmental Consideration of Nuclear Engineering .....	..	3
Ind. Ed. 143, 144—Industrial Safety Education .....	2	2
EN FP 111—Special Hazards and Problems .....	4	..
EN FP 112—Fire Protection Fluids and Systems .....	3	..
EN FP 114—Fire Analysis .....	..	3
EN FP 117—Technical Projects .....	..	4
Approved Technical Electives .....	3	3
Total .....	18	18

## AGRICULTURAL ENGINEERING

The Department of Agricultural Engineering, in the College of Agriculture, offers a four-year academic program leading to the degree of Bachelor of Science. The program is described in the catalog of the College of Agriculture.

# Cognate Activities

DEPARTMENTS IN THE COLLEGE OF ENGINEERING WHICH CONTRIBUTE significantly to activities in education, research, and professional service—although they have no academic curricula—include the Institute of Fluid Dynamics and Applied Mathematics; the Department of Wind Tunnel Operations; and the Fire Service Extension Department. These Departments work closely with academic departments of the University in areas of common interest. The scope of work in each department area is outlined briefly in paragraphs which follow.

Fellowship grants and contracts for fundamental research contribute to the overall professional-scientific activity of the staff of the College. The staff of the College of Engineering available for research studies will be glad to discuss proposed problems of importance to industry and of public interest where means can be found for the cooperative researches; such studies may be undertaken with the approval of the administration of the University.

## *Institute for Fluid Dynamics and Applied Mathematics*

The Institute for Fluid Dynamics and Applied Mathematics is a center for fundamental theoretical and experimental research in the physical and mathematical sciences. It plays a vital role in the University program of higher education by providing facilities for predoctoral and postdoctoral study. Further, it provides an important link between the University and the broad scientific and technological community.

Investigations in applied mathematics traditionally have centered on partial differential equations of mathematical physics, specifically initial value, boundary value and eigenvalue problems and their numerical treatment. More recently, attention has been drawn to current questions in ordinary differential equations such as hereditary dependence and control theory, and to mathematical methods in statistical mechanics and theoretical biology. Theoretical studies of gas dynamics and plasma dynamics are carried out in conjunction with laboratory investigations employing facilities such as shock tubes and a thermal plasma device (Q-machine). Applications to astrophysics, e.g., the elemental abundance problem, to nonlinear mechanics and to space physics engage the attention of the staff. Research in meteorology as an extension of fluid dynamics to planetary atmospheres encompasses both theoretical and experimental techniques. The Institute's research program is partially supported by outside contracts and grants.

Staff members are available for thesis direction of graduate students pursuing advanced degrees in various departments of the University. Approximately 100 master's and Ph.D. degrees were earned during the period 1951-65 in the departments of Mathematics, Physics and Astronomy, Mechanical Engineering and Aerospace Engineering with theses under the

## COGNATE ACTIVITIES

direction of Institute faculty. In addition, staff members have taught many graduate and undergraduate courses in other departments of the University. Fellowships and research graduate assistantships are available to support the studies of qualified graduate students, and the Institute offers its facilities and financial support both to post-doctoral fellows and senior scholars on leave from other institutions.

Institute staff members work closely with faculty and staff of other University departments on problems of mutual interest, and with scientists at many governmental and educational institutions in the Washington-Baltimore area.

## WIND TUNNEL OPERATIONS

The Wind Tunnel Operations Department conducts a program of experimental research and development in cooperation with the aircraft industry, agencies of government, and other industries with problems concerning aerodynamics. Testing programs cover a variety of subjects including all types of aircraft, missiles, ordnance, parachutes, radar antennas, trucks, automobiles, structures, and exterior equipment subject to high winds.

The Department has a 7.75x11-foot wind tunnel that can be operated at speeds from 0 to 240 mph. This facility has powered model drive equipment, and auxiliary vacuum and high pressure air supplies for boundary layer control studies. Supporting shops include complete wood-working, machine shop, photographic, and instrumentation facilities.

The full time staff of the Department includes engineering, computing, shop, and technical operations personnel. This staff cooperates with other faculty and students in the College of Engineering on special problems of mutual interest.

## FIRE SERVICE EXTENSION DEPARTMENT

The Fire Service Extension Department provides in-service training for volunteer, municipal, and industrial firemen and serves in an advisory capacity in matters of fire prevention, fire protection, and fire safety regulations. Classes are conducted in Maryland by local instructors who work under the guidance of Senior Instructors of the Department. Basic training is given in the fundamentals of firemanship. An advanced course covers the technical field of fire prevention, control and extinguishment. Specialized courses are offered for fire officers in tactics and strategy of fire suppression and in fire department administration. A training course of 42 clock hours for rescue operations is also available. An increasingly important program is that of establishing and improving fire prevention and fire protection in Maryland industry, institutions and merchantile establishments.

A four-day short course is held annually in September at the University. Specialized courses include instructor training, pump school series, hydraulics, aerial ladders. There are also conferences for fire company presidents, conferences for fire chiefs, and schools for fire officers.

Additional information may be obtained from the Director, Fire Service Extension Department, University of Maryland, College Park, Maryland.

## OTHER RESEARCH LABORATORIES

The National Sand and Gravel Association and the National Ready Mixed Concrete Association have research laboratories on the campus. These agencies also sponsor fellowships for graduate students who will devote half-time to graduate study and half-time to research on approved projects in their respective areas of interest. Fellows will be selected from applicants who have been admitted to graduate study in some field of engineering. Applications for admission to graduate study should be made on forms that may be obtained from the Dean of the Graduate School, University of Maryland, College Park, Maryland.

# Course Offerings

THE UNIVERSITY RESERVES THE RIGHT TO CHANGE ANY PROVISIONS OR requirements at any time within the student's term of residence; or to withdraw or discontinue any course; or to ask a student to withdraw when it considers such action to be in the best interests of the University. If a scheduled course is withdrawn or discontinued, the fee charged for such course will be returned, and the corresponding fee for change in registration will not be charged.

Courses designated by numbers 1 to 99 are for undergraduates; above 200 for graduate students; and from 100 to 199 for advanced undergraduates and (subject to official approval) for graduates also.

A separate schedule of courses is issued each semester showing the hours, places of meeting, and other information required by the student in making out his program. These schedules for a particular semester are available during its period of registration.

The responsibility for proper registration and for satisfying stated prerequisites for any course must rest with the student—as does the responsibility for proper achievement in courses in which he is enrolled. Each student should be familiar with the provisions of this catalog, *University General and Academic Regulations*, and other pertinent regulations.

## AEROSPACE ENGINEERING

*Professors:* SHERWOOD, CORNING, WESKE, AND PAI.\*

*Associate Professors:* MELNIK, RIVELLO, AND SCHETZ.

*Instructors:* LUBARD, REDDY, AND REILLY.

*Lecturers:* BILLIG, LOBB, AND WILSON.

### *For Advanced Undergraduates and Graduates*

#### EN AE 101. AERODYNAMICS I. (3)

First semester. Three lectures a week. Prerequisites, Phys. 21 and Math. 21. Basic fluid mechanics and aerodynamic theory. (Melnik.)

#### EN AE 102. AERODYNAMICS II. (2)

Second semester. Two lectures a week. Prerequisite, EN AE 101. Elements of compressible flow and application to engineering problems. (Sherwood.)

#### EN AE 107, 108. DESIGN OF AEROSPACE VEHICLES. (4, 4)

First and second semesters, two lectures and two lecture calculation periods a week. Prerequisites, EN AE 101, 102 and 113; first semester, theory background and methods of airplane design, subsonic, supersonic and VTOL; second semester, theory background and methods of space vehicle design, manned orbiting vehicles, manned Lunar and Martian landing systems. (Corning.)

---

\*Institute for Fluid Dynamics and Applied Mathematics.

## EN AE 109, 110. FLIGHT PROPULSION. (3, 3)

Two lectures and one laboratory period a week. Prerequisites, EN MEI and EN AE 101. Operating principles of piston, turbojet, turboprop, ramjet, and rocket engines. Thermodynamic processes and engine performance, aero-thermochemistry of combustion, fuels and propellants, energy for space flight.

(Weske.)

## EN AE 111, 112. ELECTIVE RESEARCH. (2, 2)

One lecture and one laboratory period a week. Prerequisites, EN AE 102 and EN AE 113. Wind tunnel tests; structure tests. Written and oral reports on original research projects.

(Staff.)

## EN AE 113, 114. FLIGHT STRUCTURES. (4, 3)

First semester, three lectures and one calculation period a week; second semester, three lectures a week. Prerequisites, EN ES 20 and Math. 64. Principles and problems of stress analysis and structural design of flight structures.

(Rivello.)

## EN AE 115. AERODYNAMICS III. (3)

Prerequisite, EN AE 102. Elementary theory of the flow of an incompressible fluid.

(Sherwood.)

## EN AE 117. AIRCRAFT VIBRATIONS. (3)

Three lectures a week. Prerequisite, Math. 66. Vibration and other dynamic problems occurring in structures. Specific topics of study include the single degree of freedom system, damping, forced vibrations, critical frequency, multiple degrees of freedom, and vibration isolation and absorption.

(Schetz.)

## EN AE 118. DYNAMICS OF AEROSPACE VEHICLES. (3)

Second semester. Prerequisites, EN AE 101, 102, 115. Stability, control, loads and miscellaneous topics in dynamics.

(Corning.)

### *For Graduates*

## EN AE 220, 221. AERODYNAMICS OF INCOMPRESSIBLE FLUIDS. (3, 3)

Prerequisites, EN AE 115. Math. 113 or 163. Fundamental equations and concepts of fluid mechanics. Irrotational motion. Circulation theory of lift. Thin airfoil theory. Lifting line theory.

(Schetz.)

## EN AE 222, 223. AERODYNAMICS OF VISCOUS FLUIDS. (3, 3)

Prerequisites, EN AE 101, EN AE 102, Math. 66. Fundamental concepts. Navier-Stokes' equations. Simple exact solutions. Laminar boundary layer theory. Pohlhausen method. Turbulent boundary layer; mixing length, similarity and statistical theories and their applications. Boundary layer in compressible flow.

(Weske.)

## EN AE 224, 225. AERODYNAMICS OF COMPRESSIBLE FLUIDS. (3, 3)

Prerequisites, EN AE 115, Math. 66. One dimensional flow of a perfect compressible fluid. Shock waves. Two-dimensional linearized theory of compressible flow. Two-dimensional transonic and hypersonic flows. Exact solutions of two dimensional isotropic flow. Linearized theory of three-dimensional potential

## AEROSPACE ENGINEERING

flow. Exact solution of axially symmetrical potential flow. One-dimensional viscous compressible flow. Laminar boundary layer of compressible fluids. (Pai.)

### EN AE 230, 231. THE AERODYNAMICS OF HIGH ALTITUDE VEHICLES. (3, 3)

Prerequisite, permission of instructor. Aerothermodynamic study of several types of high altitude, hypersonic vehicles including ballistic, boost-glide and satellite vehicles. Examination of problems in stability, control, boundary-layer growth, shockwave interactions and convective and radiative heating. (Wilson.)

### EN AE 232, 233. WAVE PROPAGATION IN GASES AND SOLIDS. (3, 3)

Prerequisite, permission of instructor. Application of method of characteristics to unsteady compressible flow. Study of isentropic and non-isentropic flows of both ideal and non-ideal gases. The Lagrange ballistic problem, detonation, the shock tube and spherical waves. Impact loading on elastic-plastic materials, the stopping shock, interactions and reflections in solids. Stress and strain produced in solids with varying cross-sectional area. (Seigel.)

### EN AE 234, 235. AEROSPACE FACILITIES AND TECHNIQUES. (3, 3)

Prerequisite, permission of instructor. Problems in supersonic and hypersonic tunnel development such as the aerodynamic design of nozzles, diffusers, storage systems and arc heaters. Shock tubes and shock tube wind tunnels. Development of ballistic ranges and basic considerations in the design of high-speed launchers. Instrumentation and data reduction. (Lobb.)

### EN AE 236, 237. HEAT TRANSFER PROBLEMS ASSOCIATED WITH HIGH VELOCITY FLIGHT. (3, 3)

Prerequisite, permission of instructor. Heat conduction in solids and thermal radiation of solids and gases. Analytic solutions to simple problems and numerical methods for solving complicated problems. Convective heating associated with laminar and turbulent boundary-layer flow. Heat transfer equations for selected body shapes such as cones and hemispheres. Real gas effects on convective heating. (Wilson.)

### EN AE 250, 251. ADVANCED FLIGHT STRUCTURES. (3, 3)

Prerequisites, Math. 66 and EN AE 113, 114, or permission of the instructor. Advanced topics in structural theory with applications to flight vehicle structures. Energy and matrix methods, plate theory, introduction to shell theory. (Rivello.)

### EN AE 260, 261. ADVANCED PROPULSION. (3, 3)

Prerequisites, M. E. 100; EN AE 109, 110. Special problems of thermodynamics and dynamics of aircraft power plants; jet, rocket and ramjet engines; plasma, ion and nuclear propulsion for space vehicles. (Billig.)

### EN AE 270, 271. FLIGHT DYNAMICS. (3, 3)

Prerequisites, Math. 66 and EN AE 114. Dynamics of a rigid body and applications to airplane dynamics. Generalized coordinates and Lagrange's equations. Vibrations of simple systems. Dynamics of elastically connected masses. Influence coefficients. Mode shapes and principal oscillations. Transient stresses in an elastic structure. Wind divergence and aileron reversal. Theory of two dimensional oscillating airfoil. Flutter problems. Corrections for finite span. Compressibility effects.

## AEROSPACE ENGINEERING CHEMICAL ENGINEERING

### EN AE 290. SEMINAR.

(Credit in accordance with work outlined by Aerospace Engineering staff.)  
First and second semesters.

### EN AE 291, 292. SELECTED TOPICS IN AEROSPACE ENGINEERING. (3, 3)

Prerequisite, permission of instructor. Topics of current interest and recent advances in the field.

### EN AE 399. RESEARCH.

(Credit in accordance with work outlined by Aerospace Engineering staff.)  
First and second semesters. Prerequisite, graduate standing. (Staff.)

## CHEMICAL ENGINEERING

*Professors:* BECKMANN, DUFFEY, MARCHELLO, SCHROEDER, AND SILVERMAN.

*Associate Professors:* GOMEZPLATA, AND SKOLNICK.

*Assistant Professors:* CADMAN, GLOMB, MUNNO, AND SMITH.

*Lecturers:* ASKEW, GOLDMAN, AND GOLDSTEIN.

### EN CH 15. CHEMICAL ENGINEERING ANALYSIS. (2)

First semester. Prerequisite, Chem. 3 or equivalent. Introduction to methods of chemical engineering analysis. Stoichiometric relations, correlation of chemical and physical properties, application of material and energy balances to chemical engineering operations and processes.

### EN CH 50. ENGINEERING THERMODYNAMICS. (3)

Second semester. Prerequisite, EN CH 15. Fundamental principles of thermodynamics and their application to engineering problems. First and second laws of thermodynamics, properties of gases, liquids and solids, phase equilibrium, flow and non-flow systems, production of work from heat.

### *For Advanced Undergraduates and Graduates*

### EN CH 109. CHEMICAL PROCESS THERMODYNAMICS. (3)

First semester. Prerequisite, EN CH 50. Estimation of thermodynamic properties of pure substances and mixtures. Chemical and phase equilibria in ideal and non-ideal systems. Thermodynamic analysis of processes, equilibrium stage operations, thermodynamics of chemically reacting systems.

### EN CH 116. APPLIED MATHEMATICS IN CHEMICAL ENGINEERING. (3)

Second semester. Prerequisites, Math. 21 and EN CH 127. Mathematical technique applied to the analysis and solution of chemical engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods.

## CHEMICAL ENGINEERING

### EN CH 127, 129, 131. TRANSFER AND TRANSPORT PROCESSES I, II, III. (4, 3, 3)

First, second, and first semesters, respectively. Prerequisite, EN CH 50. A three semester sequence of courses covering the theory and applications of molecular and turbulent transport phenomena. Principles of fluid mechanics, mass transfer and heat transfer. Dimensional analysis, analogy between heat, mass and momentum transfer, Newtonian and non-Newtonian flow, convective heat and mass transfer. Steady and unsteady state diffusion and conduction, simultaneous heat and mass transfer, interphase transfer, boundary layer theory. The equilibrium stage concept and its application to absorption, extraction, and distillation. Analysis of multiple stage processes. Principles of radiant heat transfer, evaporation, filtration, crystallization, drying, condensation, boiling, humidification, ion exchange, and phase separations.

### EN CH 133, 134. CHEMICAL ENGINEERING SEMINAR. (1, 1)

Prerequisite, Senior standing. Oral and written reports on recent developments in chemical engineering and the process industries. Fall and Spring Semesters.

### EN CH 137. CHEMICAL ENGINEERING LABORATORY. (3)

First or second semester. Prerequisite, EN CH 129. Laboratory fee, \$10.00. Application of chemical engineering process and unit operation principles in small scale semi-commercial equipment. Data from experimental observations are used to evaluate performance and efficiency of operations. Emphasis is placed on correct presentation of results in report form.

### EN CH 140. INTRODUCTION TO NUCLEAR TECHNOLOGY. (2)

First and second semesters. Two lectures a week. Prerequisites, Math 21 and Phys. 21. Engineering problems of the nuclear energy complex, including basic theory, nuclear reactor design, and isotopic and chemical separations. Emphasis is on the nuclear fission reactor. (Duffey.)

### EN CH 142. ENVIRONMENTAL CONSIDERATION OF NUCLEAR ENGINEERING. (3)

First semester. Three lectures a week. Prerequisite, permission of instructor. Protection of the public and the environment from the hazards of nuclear energy operations. Handling and disposal of gaseous, liquid and solid radioactive wastes. Meteorological, hydrological and geological phases. Typical problems from mining of ores through nuclear reactor operations and chemical separations. Legislative and economic factors, site selection, plant design and operation as related to the environment. (Silverman, Munno.)

### EN CH 145. CHEMICAL ENGINEERING KINETICS. (2)

First semester. Prerequisite, Chem. 187. Fundamentals of chemical reaction kinetics and their application to the design and operation of chemical reactors. Reaction rate theory, homogeneous reactions in batch and flow systems, adsorption, heterogeneous reactions and catalysis, electrochemical reactions. Catalytic reactor design.

### EN CH 147. PROCESS ENGINEERING AND DESIGN. (3)

Second or first semester. Prerequisite, EN CH 129. Utilization of chemical engineering principles for the design of process equipment. Typical problems in the design of chemical plants. Comprehensive reports are required.

**EN CH 148. NUCLEAR TECHNOLOGY LABORATORY. (3)**

One lecture and two laboratory periods a week. Prerequisites, Chem. 3, Phys. 21, Math. 21. EN Ch. 140, or equivalent, and permission of instructor. Laboratory fee, \$8.00 per semester. Techniques of detecting and making measurements of nuclear or high energy radiation. Radiation safety experiments. Both a sub-critical reactor and the 10-KW swimming pool critical reactor are sources of radiation. (Silverman, Munno.)

**EN CH 149. CHEMICAL ENGINEERING ECONOMICS. (2)**

Second semester. Prerequisite, EN CH 129. Principles of engineering economics applied to chemical processes. Optimizing methods in the design and operation of industrial processes. Determination of investment and operating costs for chemical plants.

**EN CH 150. CHEMICAL PROCESS DEVELOPMENT. (3)**

First semester. Prerequisite, EN CH 129. Chemical process industries from the standpoint of technology, raw materials, products and processing equipment. Operations of the major chemical processes and industries combined with quantitative analysis of process requirements and yields.

**EN CH 152. ADVANCED CHEMICAL ENGINEERING ANALYSIS. (2)**

Second semester. Prerequisite, EN CH 116. Application of digital and analog computers to chemical engineering problems. Numerical methods, programming, differential equations, curve fitting, amplifiers and analog circuits.

**EN CH 154. NUMERICAL AND STATISTICAL ANALYSIS. (2)**

Second semester. Prerequisite, EN CH 116. Use of probability and statistics in chemical engineering. Probability, normal distribution and measure of variability. The chi square, and the t-test. Correlation and regression analysis. Introduction to analysis of variance and sequential analysis.

**EN CH 155. CHEMICAL PROCESS LABORATORY. (2)**

First semester. Prerequisite, EN CH 129, and 145 concurrently. Laboratory fee, \$10.00. Experimental study of various chemical processes through laboratory and small semi-commercial scale equipment. Reaction kinetics, fluid mechanics, heat and mass transfer.

**EN CH 157. CHEMICAL ENGINEERING SYSTEMS ANALYSIS AND DYNAMICS. (3)**

First semester. Prerequisite, EN CH 116. Dynamic response applied to process systems. Goals and modes of control; LaPlace transformations; representation, analysis and synthesis of simple control systems; closed loop response; dynamic testing; role of modern computing machinery in process control.

**EN CH 159. DYNAMICS AND CONTROL LABORATORY. (2)**

Second semester. Prerequisite, EN CH 116, 157 concurrently. Laboratory fee, \$10.00. Methods of process control. Dynamics and response of process systems, modes of control, synthesis of simple control schemes. Use of experimental and mathematical models of control systems.

**EN CH 165. RESEARCH. (2 or 3)**

First and second semesters. Prerequisite, Permission of the staff. Laboratory fee, \$10.00. Investigation of a research project under the direction of one of the staff members. Comprehensive reports are required.

## CHEMICAL ENGINEERING

### EN CH 170. STRUCTURE AND PROPERTIES OF ENGINEERING MATERIALS. (3)

A comprehensive survey of the atomic and electronic structure of solids with emphasis on the relationship of structure to the physical and mechanical properties.

### EN CH 171. PHYSICAL CHEMISTRY OF ENGINEERING MATERIALS. (3)

Equilibrium multicomponent systems and relationship to the phase diagram. Thermodynamics of polycrystalline and polyphase materials. Diffusion in solids, kinetics of reactions in solids.

### EN CH 172. TECHNOLOGY OF ENGINEERING MATERIALS. (3)

Relationship of properties of solids to their engineering applications. Criteria for the choice of materials for electronic, mechanical and chemical properties. Particular emphasis on the relationships between structure of the solid and its potential engineering application.

### EN CH 173. PROCESSING OF ENGINEERING MATERIALS. (3)

The effect of processing on the structure of engineering materials. Processes considered include refining, melting and solidification, purification by zone refining, vapor phase processing, mechanical working and heat treatments.

### *For Graduates*

### EN CH 201. GRADUATE SEMINAR. (1)

First and second semesters. Discussion of current advances and research in chemical engineering. Presented by graduate students and staff.

### EN CH 203. CHEMICAL ENGINEERING THERMODYNAMICS. (3)

First semester. Advanced application of the general thermodynamic methods to chemical engineering problems. First and second law consequences; estimation and correlation of thermodynamic properties; phase and chemical reaction equilibria. (Glomb.)

### EN CH 205. TRANSPORT PHENOMENA. (3)

First semester. Heat, mass and momentum transfer theory from the viewpoint of the basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory, mechanics of turbulent transport; with specific application to complex chemical engineering situations.

(Marchello, Glomb.)

### EN CH 207. TRANSFER OPERATIONS. (3)

Second semester. Prerequisite, EN CH 205. Applications of heat, mass and momentum transfer theory to chemical engineering problems. Transfer coefficients; heat, mass and momentum analogies; two-phase flow; boiling and condensation; radiation heat transfer. (Marchello, Glomb.)

### EN CH 209. COMPLEX EQUILIBRIUM STAGE PROCESSES. (3)

Second semester. The theory and application of complex equilibrium stages. Binary and multicomponent distillation; multicomponent absorption; extraction; liquefaction. (Glomb.)

## CHEMICAL ENGINEERING

### EN CH 211. ADVANCED CHEMICAL REACTION KINETICS. (3)

Second semester. The theory and application of chemical reaction kinetics to reactor design. Reaction rate theory; homogeneous batch and flow reactors; fundamentals of catalysis; design of heterogeneous flow reactors.

(Beckmann, Marchello.)

### EN CH 223. PROCESS ENGINEERING AND DESIGN. (3)

First and second semesters. Coordination of chemical engineering and economics to advanced process engineering and design. Optimization of investment and operating costs. Solution of typical problems in the design of chemical engineering plants.

(Schroeder.)

### EN CH 235. CHEMICAL PROCESS DYNAMICS. (3)

First semester. Prerequisites, differential equations or consent of instructor. Analysis of open and closed control loops and their elements; dynamic response of processes; choice of variables and linkages; dynamic testing and synthesis; noise and drift; chemical process systems analysis; strategies for optimum operation.

(Smith, Cadman.)

### EN CH 247. SPECIAL PROBLEMS IN CHEMICAL ENGINEERING.

First and second semesters. Special study and/or investigation in chemical engineering under the direction of an assigned faculty advisor. Since content changes, re-registration is permissible.

(Staff.)

### EN CH 253. ADVANCED TOPICS IN THERMODYNAMICS. (3)

Second semester. *Offered in alternate years.* Prerequisite, EN CH 203. (Staff.)

### EN CH 255. ADVANCED TOPICS IN CHEMICAL REACTION SYSTEMS. (3)

First semester. *Offered in alternate years.* Prerequisite, EN CH 211.

(Beckmann.)

### EN CH 257. ADVANCED TOPICS IN TRANSFER THEORY. (3)

First semester. *Offered in alternate years.* Offered 1963-64. Prerequisite, EN CH 207.

(Glomb.)

### EN CH 259. ADVANCED TOPICS IN SEPARATION PROCESSES. (3)

Second semester. *Offered in alternate years.* Offered 1965-66. (Marchello.)

### EN CH 301. SEMINAR IN NUCLEAR ENGINEERING. (1)

First and second semesters, one meeting a week. Survey of nuclear engineering literature, and oral presentation of prepared reports. Since the content of this course is changing, a student may receive a number of credits by re-registration.

(Duffey, Silverman, Munno.)

### EN CH 302, 303. NUCLEAR REACTOR ENGINEERING. (3, 3)

First and second semesters. Three lectures a week. Prerequisite, permission of instructor. Design, construction and operation of typical nuclear reactors, including general design, nuclear reactor theory, materials of construction, heat transfer, and control.

(Duffey, Munno.)

### EN CH 308, 309. NUCLEAR REACTOR LABORATORY. (3, 3)

Two lectures and two laboratory periods a week. Prerequisites, permission of instructor, EN Ch. 148, 302, 303, 305, or equivalent. Laboratory fee \$10.00 per

## CHEMICAL ENGINEERING

semester. The University of Maryland 10-KW swimming pool reactor is employed in experiments on reactor startup and operation, shielding, control, neutron flux distributions, neutron and gamma spectrum, cross section measurements. (Duffey.)

### EN CH 311. NUCLEAR FUEL AND WASTE PROCESSING. (3)

First semester. Three lectures a week. Processing of nuclear fuel and treatment of nuclear waste. Includes: (1) processing of uranium, thorium, and other ores; (2) chemical separation of plutonium, uranium, fission products and other elements from materials irradiated in nuclear reactors; (3) treatment of radioactive wastes; (4) isotopic separation of U235; and (5) isotopic separation of heavy water and other materials. (Silverman.)

### EN CH 313. SELECTED TOPICS IN NUCLEAR ENGINEERING. (2)

Two lectures a week. Prerequisite, permission of instructor. Topics of current interest and recent advances in the nuclear engineering field. Because of the rapid advances in the field, information on special topics of much practical importance is continually becoming available. Since the content changes, re-registration may be permitted. (Duffey, Silverman, Munno.)

### EN CH 314. SPECIAL PROBLEMS IN NUCLEAR ENGINEERING.

Credit hours to be arranged. Prerequisite, consent of instructor. Laboratory fee, \$10.00 per semester. (Staff.)

### EN CH 315, 316. RADIATION ENGINEERING. (3, 3)

Second semester. Two lectures a week. Prerequisite, permission of instructor. An analysis of such radiation applications as synthesizing chemicals, preserving foods, control of industrial processes. Design of irradiation installations, e.g., cobalt 60 gamma ray sources, electronuclear machine arrangements, and chemonuclear reactors. (Silverman.)

### EN CH 317. RADIATION EFFECTS LABORATORY. (3)

Prerequisite, permission of instructor. Effect of massive doses of radiation on the properties of matter for purposes other than those pointed toward nuclear power. Radiation processing, radiation-induced chemical reactions, and conversion of radiation energy; isotope power sources. (Silverman.)

### EN CH 320. NUCLEAR REACTOR PHYSICS I. (3)

First semester. Introduction to neutron physics. The theory of neutron detection instruments including the neutron chopper and solid state detectors. Elements of neutron slowing-down theory. The Boltzman transport equation will be developed together with approximations such as Pn, Sn, and Fermi Age. Nuclear systems will be theoretically treated utilizing the diffusion approximation, the Fermi Age method and the P-3 method. Elementary temperature and time dependence.

### EN CH 321. NUCLEAR REACTOR PHYSICS II. (3)

Second semester. Prerequisite: EN CH 320. Mathematical treatment of nuclear reactor systems. To be presented in this course are the foundations of nuclear reactor kinetics, the multigroup treatment, reflected reactor theory, heterogeneous reactors, perturbation theory. Thermalization theory and the pulse and sine-wave techniques. Introduction to variational methods.

**EN CH 331. NEUTRAL PARTICLE TRANSPORT THEORY. (3)**

First semester. Prerequisite: EN CH 320 or permission of instructor. Transport equations for neutrons and gamma rays. Infinite space and Milne problems. Spherical harmonic and variational methods. Special methods of solving transport equations.

**EN CH 333. RADIATION SHIELDING AND ENERGY DEPOSITION. (3)**

First semester. Prerequisite: EN CH 320 or permission of instructor. A study of the interactions of nuclear radiations with matter. Includes electron, gamma and neutron attenuation, dose calculations, chemical changes, heat generation and removal in shields.

**EN CH 337. NUCLEAR REACTOR DYNAMICS. (3)**

Second semester. Prerequisites: EN CH 321. Principles of reactor control and operation. Neutron kinetics, temperature and coolant flow effects, transfer function, stochastic processes. Stability analysis. Accident calculations. Use of analog computer for simulation and problem solving.

**EN CH 350. STRUCTURE OF ENGINEERING MATERIALS. (3)**

The structural aspects of crystalline and amorphous solids and relationship to bonding types. Point and space groups. Summary of diffraction theory and practice. The Reciprocal Lattice. Relationships of the microscopically measured properties to crystal symmetry. Structural aspects of defects in crystalline solids.

**EN CH 351. ELECTRONIC STRUCTURE OF ENGINEERING SOLIDS. (3)**

Prerequisite: EN CH 350 or EN ME 350. Description of electronic behavior in engineering solids. Behavior of conductors, semiconductors and insulators in electrical fields. Thermal, magnetic and optional properties of engineering solids.

**EN CH 359. SPECIAL TOPICS IN STRUCTURE OF ENGINEERING MATERIALS. (3)**

Prerequisite, consent of instructor.

**EN CH 360. CHEMICAL PHYSICS OF ENGINEERING MATERIALS. (3)**

Prerequisite, EN CH 350 or EN ME 350. Thermodynamics and statistical mechanics of engineering solids. Cohesion, thermodynamic properties. Theory of solid solutions. Thermodynamics of mechanical, electrical, and magnetic phenomena in solids. Chemical thermodynamics, phase transitions and thermodynamic properties of polycrystalline and polyphase materials. Thermodynamics of defects in solids.

**EN CH 361. KINETICS OF REACTIONS IN MATERIALS. (3)**

Prerequisite, EN CH 360 or EN ME 360. The theory of thermally activated processes in solids as applied to diffusion, nucleation and interface motion. Cooperative and diffusionless transformations. Applications selected from processes such as allotropic transformations, precipitation, martensite formation, solidification, ordering, and corrosion.

**EN CH 369. SPECIAL TOPICS IN THE CHEMICAL PHYSICS OF MATERIALS. (3)**

Prerequisite, consent of instructor.

## CHEMICAL ENGINEERING

### EN CH 370. RHEOLOGY OF ENGINEERING MATERIALS. (3)

Prerequisite, EN CH 350 or EN ME 350. Mechanical behavior with emphasis on the continuum point of view and its relationship to structural types. Elasticity, viscoelasticity, anelasticity and plasticity in single phase and multiphase materials.

### EN CH 371. DISLOCATIONS IN CRYSTALLINE MATERIALS. (3)

Prerequisite, EN CH 350 or EN ME 350. The nature and interactions of defects in crystalline solids, with primary emphasis on dislocations. The elastic and electric fields associated with dislocations. Effects of imperfections on mechanical and physical properties.

### EN CH 372. MECHANICAL PROPERTIES OF ENGINEERING MATERIALS. (3)

Prerequisite, EN CH 370 or EN ME 370. The mechanical properties of single crystals, polycrystalline and polyphase materials. Yield strength, work hardening, fracture, fatigue and creep are considered in terms of fundamental material properties.

### EN CH 379. SPECIAL TOPICS IN THE MECHANICAL BEHAVIOR OF ENGINEERING. SOLIDS. (3)

Prerequisite, consent of instructor.

### EN CH 380. EXPERIMENTAL METHODS IN MATERIALS SCIENCE. (3)

Methods of measuring the structural aspects of materials. Optical and electron microscopy. Microscopic analytical techniques. Resonance methods. Electrical, optical and magnetic measurement techniques. Thermodynamic methods.

### EN CH 381. DIFFRACTION TECHNIQUES IN MATERIALS SCIENCE. (3)

Prerequisite, EN CH 350 or EN ME 350. Theory of diffraction of electrons, neutrons and x-rays. Strong emphasis on diffraction methods as applied to the study of defects in solids. Short range order, thermal vibrations, stacking faults, microstrain.

### EN CH 389. SPECIAL TOPICS IN EXPERIMENTAL TECHNIQUES IN MATERIALS SCIENCE. (3)

Prerequisite, consent of instructor.

### EN CH 390. POLYMERIC ENGINEERING MATERIALS. (3)

Prerequisite, EN CH 350 or EN ME 350 or consent of instructor. A comprehensive summary of the fundamentals of particular interest in the science and applications of polymers. Polymer single crystals, transformations in polymers, fabrication of polymers as to shape and internal structure.

### EN CH 391. SPECIAL TOPICS IN MATERIALS TECHNOLOGY. (3)

Prerequisite, consent of instructor.

### EN CH 397. SEMINAR IN ENGINEERING MATERIALS. (1)

Discussion of current advances and research in engineering solids.

### EN CH 398. SPECIAL PROBLEMS IN ENGINEERING MATERIALS.

Special study or investigation in Materials Science under the direction of an assigned faculty advisor. Credit variable and since content changes, re-registration is permissible.

**EN CH 399. RESEARCH IN CHEMICAL ENGINEERING. RESEARCH IN NUCLEAR ENGINEERING. RESEARCH IN ENGINEERING MATERIALS.**

Credit hours to be arranged. Laboratory fee, \$8.00 per semester (Research in Chemical Engineering). Laboratory fee, \$10.00 per semester (Research in Nuclear Engineering). The investigation of special problems and the preparation of a thesis in partial fulfillment of the requirements of an advanced degree. (Staff.)

## CIVIL ENGINEERING

*Professors:* LOONEY, LEPPER AND OTTS.

*Associate Professors:* COUNRYN, GOHR, PIPER AND WEDDING.

*Assistant Professors:* COOKSON, GARBER, AND MERCIER.

*Instructors:* HEINS, REILLY, AND SCHELLING.

*Lecturers:* BLOEM, ROBERTS AND WALKER.

**EN CE 50. FUNDAMENTALS OF ENGINEERING MATERIALS. (3)**

First and second semester. Two lectures and one laboratory per week. Prerequisite, EN ES 20, or concurrent registration. Properties and constitution of the principal materials used in civil engineering; laboratory tests for these properties, interpretation of test results and of specifications.

**EN CE 90. ENGINEERING SURVEY MEASUREMENTS. (3)**

First and second semester. Two lectures and one laboratory per week. Prerequisite, Math. 20, or concurrent registration. Standards, units, calibration; measurement of distance, elevation, angles; systematic and random error analysis in measurements; fundamentals of mapping; instrumentation.

*For Advanced Undergraduates and Graduates*

**EN CE 100. ENGINEERING ANALYSIS AND COMPUTER PROGRAMMING. (3)**

Second semester. Three lectures per week. Prerequisite, EN CE 112 or concurrent registration. Elements of operational calculus, vector analysis, numerical methods and programming for computers. Errors, interpolation, series, integration, iteration and solution of equations. (Garber.)

**EN CE 102. FUNDAMENTALS OF STRUCTURAL ANALYSIS. (3)**

First semester. Three lectures per week. Prerequisites, EN ES 20 and EN CE 50. Basic statics and mechanics of structural systems. Introduction to indeterminate analysis. (Lepper, Piper.)

**EN CE 103. BASIC STRUCTURAL DESIGN. (3)**

Second semester. Three lectures per week. Prerequisite, EN CE 102. Basic elements of structural design of wood, steel and concrete without dependence on individual specifications. Classical design of beams, trusses, columns, connections and foundations. (Lepper, Piper.)

## CIVIL ENGINEERING

### EN CE 104. COMPUTER ANALYSIS. (3)

First semester. Two lectures and one laboratory per week. Prerequisites, EN CE 100 and EN CE 102. Computer methods and techniques applied to Civil Engineering problems with emphasis on structural systems. (Garber.)

### EN CE 105. BASIC FLUID MECHANICS. (3)

First semester. Three lectures per week. Prerequisite, EN ES 20, 21, Physics 20. Prerequisite, M. E. 105, or concurrent registration. The study of fluids at rest and in motion. Principles of viscous turbulent flow. Impulse and momentum concepts. Pumps, turbines and meters. Dimensional analysis and laws of similarity. (Cournyn, Reilly.)

### EN CE 106. FUNDAMENTALS OF SANITARY ENGINEERING. (3)

Second semester. Three lectures per week. Prerequisite, EN CE 105. An introduction to the basic principles for the development of water supplies, control of pollution and design and operation of water purification and waste water disposal facilities. (Otts, Cookson.)

### EN CE 107. FUNDAMENTALS OF SOIL MECHANICS. (3)

Second semester. Three lectures per week. Prerequisites, EN ES 20 and EN CE 50. Introductory study of the mechanics of aggregations and its application to earthworks and foundations. Engineering geology relative to civil engineering and soil mechanics.

### EN CE 108. FUNDAMENTALS OF TRANSPORTATION ENGINEERING. (3)

First semester. Prerequisite, EN CE 50 and EN CE 90. Engineering problems of transportation by airways, highways, pipe-lines, railways and waterways. Elementary dynamics of traffic and functional consideration of routes and terminals. (Wedding, Barber.)

### EN CE 109. BASIC CIVIL ENGINEERING PLANNING. I. (2)

First semester. Two lectures per week. Prerequisites, EN CE 103, 106, 107, and 108. Lectures in the methodology used in the application of the Basic Civil Engineering Courses to the general practice of Civil Engineering but with special emphasis on planning of extensive civil engineering works. In addition, preparation of engineering reports, specifications and project presentation; economics; functional aspects. (Piper.)

### EN CE 110. BASIC CIVIL ENGINEERING PLANNING II. (1)

Second semester. One laboratory of three hours per week. Prerequisite, EN CE 109. Laboratory for application of the program and principles developed in Basic Civil Engineering Planning I. (Piper.)

### EN CE 112. APPLIED MATHEMATICS IN ENGINEERING. (3)

First semester. Three lectures per week. Prerequisite, Math. 22. Mathematical technique applied to the analysis and solution of engineering problems. Use of differentiation, integration, differential equations, and integral transforms. Application of infinite series, numerical and statistical methods. (Mercier.)

## TECHNICAL ELECTIVES

## EN CE 125. ADVANCED STRENGTH OF MATERIALS. (3)

First semester. Three lectures per week. Prerequisite, EN ES 20. Strength and deformation of deformable bodies, plane stress and strain. Torsion theory, unsymmetrical bending, curved beams. Behavior of beams, columns, slabs, plates and composite members under load. Elastic and inelastic stability. (Lepper.)

## EN CE 126. EXPERIMENTAL STRESS ANALYSIS. (4)

Second semester. Three lectures and one laboratory per week. Application of experimental data on materials to design problems. Correlation of analytical and experimental methods of analysis with design. Electric strain gages, photoelasticity, brittle lacquer methods and various analogies. (Lepper, Wedding.)

## EN CE 127. THEORY OF ELASTICITY AND PLASTICITY. (3)

Three lectures per week. Prerequisites, EN ES 20 and EN CE 112. General formulation of the theory of mechanics of deformable media in terms of cartesian tensors. Plane state of stress, torsion of various shaped bars and thin walled sections. Bending and buckling of bars and thin plates. Introduction to the theory of plates and shells. (Mercier.)

## EN CE 135. ADVANCED SOIL MECHANICS. (4)

Three lectures and one laboratory per week. Prerequisite, EN CE 107. Theories of strength, compressibility, capillarity and permeability. Critical review of theories and methods of measuring essential properties. Planning, execution and interpretation of soil testing programs. (Barber.)

## EN CE 145. ADVANCED FLUID MECHANICS. (4)

Three lectures and one laboratory per week. Prerequisite EN CE 105. The study of the properties and flow of an ideal fluid. Viscosity, laminar and turbulent flow, flow nets, uniform flow, source, irrotational motion and circulation. Turbulence and boundary layers. (Cournyn, Reilly.)

## EN CE 155. ADVANCED MATERIALS OF ENGINEERING. (3)

Three lectures per week. Prerequisite, EN CE 50. Mechanisms of the behavior of materials under repeated, sustained and impact loads in relation to their environment. Influence of microstructure on mechanical properties. Fracture theory. Rheological aspects of the characteristics of selected materials. (Wedding.)

## EN CE 165. STRUCTURAL ANALYSIS. (3)

First semester. Three lectures per week. Prerequisite, EN CE 103. Advanced indeterminate structures, members of variable section, laterally loaded frames, continuous trusses and secondary stresses. (Garber, Schelling.)

## EN CE 166. STRUCTURAL DESIGN. (4)

Second semester. Three lectures and one laboratory per week. Prerequisite, EN CE 103. Steel and reinforced concrete design of bridges and buildings using appropriate controlling specifications. Advanced problems of modern steel and reinforced concrete. (Garber, Schelling.)

## CIVIL ENGINEERING

### EN CE 175. SANITARY ENGINEERING ANALYSIS AND DESIGN. (4)

First semester. Three lectures and one laboratory per week. Prerequisite, EN CE 106. The application of sanitary analysis and fundamental principles to the design and operation of water and waste water treatment plants and the control of stream pollution. (Otts, Cookson.)

### EN CE 176. ENVIRONMENTAL HEALTH ENGINEERING ANALYSIS. (3)

Second semester. Two lectures and one laboratory per week. Engineering analysis of water, sewage, and industrial waste. The theory and analytical techniques used in evaluating man's environment. (Otts, Cookson.)

### EN CE 185. HIGHWAY ENGINEERING. (3)

First semester. Three lectures per week. Prerequisite, EN CE 107. Location, design, construction and maintenance of roads and pavements. Introduction to traffic engineering. (Staff.)

### EN CE 186. TRANSPORTATION ENGINEERING. (3)

Second semester. Three lectures per week. Prerequisite, EN CE 108. A study of the principles of transportation engineering as applied to the various modes of transport. Consideration is given to cost analysis, economic aspects of route and site selection and layout. The organization and administration of engineering functions. (Wedding.)

### EN CE 195. ADVANCED SURVEYING. (3)

Two lectures and one laboratory per week. Prerequisite, EN CE 90. Advanced surveying theory and practice including triangulation, topographic surveying, astronomical observations, map systems, state plane coordinates, map interpretation, vertical and horizontal alignment. Computer applications.

### EN CE 199. SPECIAL PROBLEMS. (3)

Prerequisite, senior standing. A course arranged to meet the needs of exceptionally well prepared students for study in a particular field of Civil Engineering. (Staff.)

## *For Graduates*

### EN CE 221, 222. ADVANCED STRENGTH OF MATERIALS. (3, 3)

First and second semesters. Prerequisites, EN ES 20, 21, and EN CE 50 or equivalent. Analyses for stress and deformation in engineering members by the methods of mechanics of materials and elementary theories of elasticity and plasticity. Problems in flexure, torsion, plates and shells, stress concentrations, indeterminate combinations, residual stresses, stability. (Lepper.)

### EN CE 223. EXPERIMENTAL STRESS ANALYSIS. (3)

Second semester. Prerequisite, EN CE 221 or permission of instructor. Experimental methods of stress and strain analysis for static and impact forces. Structural models, brittle and plastic material methods; analogies; photoelasticity; optical, mechanical and electrical strain gages and instrumentation. (Wedding.)

### EN CE 224. ADVANCED ENGINEERING MATERIALS LABORATORY. (3)

First or second semester. Prerequisite, EN ES 20, 21 and EN CE 50 or equivalent. Critical examination of the methods for testing engineering materials and

structures under static, repeated, sustained and impact forces. Laboratory experiments for the determination of strength and stiffness of structural alloys, concrete and other construction materials. Examination of the effects of test factors on the determination of engineering properties. (Lepper, Wedding.)

**EN CE 225, 226. ADVANCED PROPERTIES OF MATERIALS. (3, 3)**

First and second semesters. Prerequisites, EN CE 221 and 222. Modern theories of the structure of matter applied to the study of elastic and plastic deformation of materials under static, repeated, sustained and impact forces. Elements of solid state physics, crystal structure, slip and dislocation theory; polycrystalline solids. Effects of low and high temperature, loading rates, and state of stress on mechanical properties and fracture. Critical study of tests and their application to strength of members. (Lepper.)

**EN CE 227, 228. THEORIES OF CONCRETE AND GRANULAR MATERIALS. (3, 3)**

First and second semester. Prerequisites, EN CE 221, 222 and 224. Critical reviews of analytical and experimental investigations of the behavior of concretes under diverse conditions of loading and environment. Mechanics of granular aggregates and the chemistry of cements. Theories of the design of portland cement and asphaltic concrete mixtures. Relations between laboratory testing and field experience. (Wedding.)

**EN CE 241. HYDRAULIC ENGINEERING. (3)**

Prerequisite, EN CE 105 or equivalent. Water power and flood control. Analysis of the principal features of a water power project with special reference to reservoir, waterway, dam, plant accessories, and power house equipment. Complete report on a water power project required, including costs and power valuation. (Cournyn.)

**EN CE 251. SOIL MECHANICS. (3)**

Prerequisites, EN CE 107, 165 and 166 or equivalent. Identification properties tests and classification methods for earth materials. Strength and deformation characteristics, hydraulic properties and permeability, shearing resistance, compressibility and consolidation, with laboratory tests for these properties. Study of the basic theories involved and the development of test procedures. (Staff.)

**EN CE 252. ADVANCED FOUNDATIONS. (3)**

Prerequisites, EN CE 107, 165, and 166 or equivalent. Principles of mechanics applied to engineering problems in foundations. Earth pressure theories, seepage and drainage phenomena, stability of footings and slopes, stresses and deformation in soils, consolidation theory and application to foundation settlements. (Staff.)

**EN CE 256. MATRIX METHODS OF STRUCTURAL ANALYSIS. (3)**

Prerequisite, EN CE 127 and EN CE 112 or equivalent. Review of basic structural and matrix theory. Use of virtual work and complementary virtual work to develop in parallel the displacement and force method for determinate and indeterminate civil engineering structures. Stiffness and flexibility matrices. Initial and thermal strain, modification and cutout procedure. Comparison of flexibility and displacement methods. Introduction to the dynamic response of structures using mode superposition and matrix methods. (Mercier.)

## CIVIL ENGINEERING

### EN CE 257. ANALYSIS OF SHELL STRUCTURES. (3)

Prerequisite, EN CE 125, EN CE 127 and EN CE 112 or equivalent. Review of some fundamental formulas from the theory of surfaces. General theory for the deformation of thin shells of reinforced concrete. Complex transformation. Application of the theory including direct stresses and bending stress to civil engineering structures such as cylindrical shells, shells of revolution and shells of arbitrary shape. Consideration of boundary conditions at the edge of shells. (Mercier.)

### EN CE 258. ADVANCED ELASTICITY. (3)

Prerequisite, EN CE 125, EN CE 127 and EN CE 112 or equivalent. Review of vector and tensor calculus. Invariant formulation of nonlinear theory including effect of large displacements, finite rotations and finite deformations. Stability of equilibrium configurations. Special civil engineering problems solved by finding the system of forces which is necessary to maintain the deformed body in equilibrium. Theory of successive approximations. (Mercier.)

### EN CE 259. NONLINEAR THEORY OF SHELL STRUCTURES. (3)

Prerequisite, EN CE 257 and EN CE 258. General formulation of a nonlinear theory of shells of arbitrary shape occurring in civil engineering structures utilizing basic concepts from vector and tensor analysis. Large deflections and rotations are considered consistent with the existence of a strain energy function which permits the derivation of a stress-strain relation. The shell problem is reduced to one of two dimensions by various procedures. After the general theory governing the equilibrium configuration of a shell structure is established, the condition of stable and unstable equilibrium is considered. (Mercier.)

### EN CE 261. CIVIL ENGINEERING PLANNING. (3)

First semester. Prerequisites, EN CE 102, 103, 165 and 166 or equivalent. General planning of large engineering projects such as industrial plants, bridges, highways, railroads, and port developments. Emphasis on general planning followed by design, construction and cost estimates. (Piper.)

### EN CE 262. CIVIL ENGINEERING PLANNING. (3)

Second semester. Prerequisite, EN CE 261. City and regional planning and development. Special problems of municipal development. Emphasis on preparing engineering reports, financing and cost estimates. Preparation of presentation to public bodies. (Piper.)

### EN CE 263. THEORY OF STRUCTURAL DESIGN. (3)

First semester. Prerequisite, EN CE 102, 103, 165 and 166 or equivalent. Advanced structural theory applied to the design of bridges and buildings. Methods of analysis for indeterminate structures, including moment distribution, Maxwell's method, virtual work, reciprocal theory, Muller Breslau's principle, and classical analytical methods. (Looney.)

### EN CE 264. THEORY OF STRUCTURAL DESIGN. (3)

Second semester. Prerequisite, EN CE 263. Correlation of theory, experience, and experiments in study of structural behavior, proportioning, and preliminary design. Special design problems of fatigue, buckling, vibrations, and impact. (Looney.)

**EN CE 265, 266. BEHAVIOR OF STRUCTURES. (3, 3)**

First and second semesters. Prerequisites, EN CE 263, and 264. A continuation of EN CE 264. Examination of the fundamental basis for the design of structures. Correlation of laboratory research, advanced structural theory and mechanics and design methods. Study of specifications, factor of safety and ultimate strength, in the relation between structural tests and design.

(Looney.)

**EN CE 271. THEORY OF WATER SUPPLY TREATMENT. (3)**

First semester. Prerequisites, EN CE 175 and 176, or consent of instructor. Three lectures a week. Properties and quality criteria of drinking water; aeration theory and practice; chemical treatment processes; sedimentation; filtration; centrifugation; disinfection; fluoridation; desalinization; corrosion and corrosion control.

(Cookson.)

**EN CE 272. THEORY OF AQUEOUS AND SOLID WASTE TREATMENT AND DISPOSAL. (3)**

Second semester. Prerequisites, EN CE 175 and 176, or consent of instructor. Three lectures a week. Theory and basic principles of treating and handling waste products; analysis of wastes; hydraulics of sewers; principles of biological, chemical, and physical treatment processes; design criteria of aerobic and anaerobic treatment processes; disposal of waste sludges and solids.

(Cookson.)

**EN CE 273. DESIGN OF WATER PURIFICATION FACILITIES. (4)**

First semester. Corequisite, EN CE 271 or equivalent. Two lectures and two laboratory periods a week. Application of basic science and engineering science to design of water supply and purification processes; design and economics of unit operations as applied to environmental systems.

(Otts, Cookson.)

**EN CE 274. DESIGN OF MUNICIPAL AND INDUSTRIAL WASTES TREATMENT FACILITIES. (4)**

Second semester. Corequisite, EN CE 272 or equivalent. Two lectures and two laboratory periods a week. Application of basic science and engineering science to design of municipal and industrial waste treatment processes; design and economics of unit operations as applied to environmental systems.

(Otts, Cookson.)

**EN CE 275. BIOLOGICAL PRINCIPLES OF ENVIRONMENTAL HEALTH ENGINEERING. (4)**

First semester. Prerequisite MICROB 101 or equivalent. Three lectures and one laboratory period a week. An exposition of biological principles directly affecting man and his environment, particularly those concerned with the aerobic and anaerobic treatment of aqueous wastes.

(Cookson.)

**EN CE 276. INDUSTRIAL WASTES. (3)**

Second semester. Corequisite, EN CE 272, or equivalent. Three lectures a week. A study of the characteristics of liquid wastes from major industries, and the processes producing the wastes. The theory and methods of eliminating or treating the wastes, and their effects upon municipal sewage-treatment plants, and receiving waters.

(Cookson.)

## ELECTRICAL ENGINEERING

### EN CE 281, 282. ADVANCED HIGHWAY ENGINEERING. (3, 3)

First and second semesters. Prerequisites, EN CE 107, 185 and 186 or equivalent. Reconnaissance and location, surveys and plans, drainage, subgrade structure, low-cost roads, base courses, flexible and rigid pavement design. Highway organization, planning, economy, and finance. Geometric design and traffic engineering.

### EN CE 296, 297. ENGINEERING ANALYSIS AND COMPUTER PROGRAMMING. (3, 3)

First and second semesters. Three lectures each week. Prerequisite, consent of Head of Department. Applications to elasticity, stability and buckling, vibrations, thin plates and shells, or other problems in the area of mechanics, structures and materials. (Roberts.)

### EN CE 298. SEMINAR.

First or second semester. Credit in accordance with work outlined by the Department. Prerequisite, consent of the Department of Civil Engineering. (Staff.)

### EN CE 399. RESEARCH.

Credit in accordance with work done. (Staff.)

## ELECTRICAL ENGINEERING

*Professors:* TOMPKINS, CHU, REED AND WAGNER.

*Associate Professors:* BASHAM, FERRIS, HOCHULI, MARCOVITZ, PRICE, PUGSLEY, REISER, RUTELLI, AND SIMONS.

*Assistant Professors:* GINNINGS AND KIM.

*Lecturers:* BULLIS, COHEN, DEGENFORD, H. C. JONES, SCHULMAN, AND WHICKER.

*Instructors:* COLBURN, FEARNSIDES, FIROUZABADI, FRIEDMAN, GLOCK, GUHA, HAHN, LARSON, MARTIN, MILLER, MOLDAVSKY, POTTALA, AND RUMBAUGH.

Courses in electrical engineering are presently offered in three general areas:

1. ELECTROMAGNETICS AND PHYSICAL ELECTRONICS
2. CIRCUITS AND CONTROL SYSTEMS
3. INFORMATION SCIENCES

Courses at 100 and 200 Level listed below are grouped under these three headings.

*Note:* Unless otherwise designated, courses will be offered each semester if enrollment permits.

*For Undergraduate Credit***EN EE 50. FUNDAMENTALS OF ELECTRICAL ENGINEERING. (3)**

Three hours of lectures per week. Prerequisites, Math. 22, Phys. 21. Required of juniors in civil engineering. Not applicable for credit in the electrical engineering major program. Principles of electrical circuits, both steady state and transient; electric power; fundamentals of electronics for control and instrumentation. (Fearnside.)

**EN EE 60, 62. PRINCIPLES OF ELECTRICAL ENGINEERING. (3, 3)**

Three hours of lecture per week. Prerequisites, Math. 22, Phys. 21. Corequisites, EN EE 61, 63. Required of aerospace, mechanical and (EN EE 60 only) chemical engineers. Not applicable in the electrical engineering major program. These courses are acceptable as prerequisites for some advanced EN EE courses. EN EE 60 includes analysis of linear systems; introduction to Laplace transforms; steady-state a-c transforms; introduction to the concepts of electromagnetic fields and electric machines. EN EE 62 includes principles and circuit applications of semiconductor devices and electron tubes. (Pottala.)

**EN EE 61, 63. ELECTRICAL ENGINEERING LABORATORY. (1, 1)**

Two hours of laboratory per week. Laboratory fee \$5.00 each semester. Corequisites, EN EE 60 (for EN EE 61) and EN EE 62 (for EN EE 63). Required of aerospace, mechanical, and (EN EE 61 only) chemical engineers. Experiments on the transient and steady-state response of linear circuits, electric machines, and electron tubes and semiconductor devices. (R. D. Martin.)

**EN EE 80. ALGORITHMIC ANALYSIS AND COMPUTER PROGRAMMING. (2)**

One hour of lecture and two hours of laboratory per week. Corequisite, Math. 21. Laboratory fee \$5.00. Required of sophomores in electrical engineering. Concept and properties of algorithms (fully defined procedures for solving problems); problems from numerical mathematics; use of a specific algorithmic language (MAD); completion of several projects using a digital computer. (Marcovitz.)

**EN EE 83. DIGITAL COMPUTER LABORATORY. (1)**

Two hours of laboratory per week. Prerequisite, EN EE 80. Laboratory fee \$5.00. Required of sophomores in electrical engineering. Completion of several projects in numerical mathematics on a digital computer, with emphasis on efficiency of computation, accuracy of approximations, and control of errors. (Miller.)

**EN EE 90. CIRCUIT ANALYSIS I. (4)**

Four hours of lecture per week. (See EN EE 91 for related laboratory course.) Corequisites, Math. 22, Phys. 21, EN EE 91. Required of sophomores in electrical engineering. Introduction to circuit theory; Ohm's law; Kirchhoff's laws; basic circuit analysis techniques; energy storage; power; elementary transients by classical and transform methods; sinusoidal analysis; introduction to complex frequency. EN EE 120 continues where EN EE 90 ends. (Simons.)

**EN EE 91. CIRCUITS LABORATORY I. (1)**

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 90. Required of sophomores in electrical engineering. Laboratory to be taken in association with EN EE 90. Electrical components and basic test equipment;

## ELECTRICAL ENGINEERING

principles of measurement and data handling; circuit behavior with variation in component values. (Pugsley.)

### *For Advanced Undergraduates and Graduates*

## ELECTROMAGNETICS AND PHYSICAL ELECTRONICS

### EN EE 130, 132. ENGINEERING ELECTROMAGNETICS I, II (3, 3)

Three hours of lecture per week. Prerequisites, Math. 22, Phys. 21, EN EE 90, with an average grade of C or better in Math. 21, 22, Phys. 20-21, and EN EE 90. Required of juniors in electrical engineering. Electric and magnetic fields, using vector notation; Maxwell's equations; Lorentz force law; capacitance, inductance, and resistance; motion of charged particles; fields in material media, polarization, magnetization; boundary value problems. (Ginnings.)

### EN EE 134. ENGINEERING ELECTROMAGNETICS III. (3)

Three hours of lecture per week. Prerequisite, EN EE 130. Required of seniors in electrical engineering. The wave equation and the impedance concept; plane waves; reflection and refraction; wave guides and transmission lines; Smith charts; lumped models. (Hochuli.)

### EN EE 135. ELECTROMAGNETIC MEASUREMENTS LABORATORY. (1)

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 134. Laboratory to be taken in association with EN EE 134. Experiments on field mapping, transmission line matching, impedance measurement; micro-wave measurements of standing wave ratio, power, frequency, Q, and coupling. (Ferris.)

### EN EE 140. TRANSDUCERS AND ELECTRICAL MACHINERY. (3)

Three hours of lecture per week. (See EN EE 141 for related laboratory course.) Prerequisites, EN EE 120, EN EE 132. Corequisite, EN EE 141. Required of seniors in electrical engineering. Electromechanical transducers; theory of electromechanical systems; power and wide-band transformers; rotating electrical machinery from the theoretical and performance points of view. (Guha.)

### EN EE 141. TRANSDUCERS AND ELECTRICAL MACHINERY LABORATORY. (1)

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 140. Required of seniors in electrical engineering. Laboratory to be taken in association with EN EE 140. Experiments on transformers; synchronous machines; induction motors; synchros; loudspeakers; other transducers. (Guha.)

### EN EE 170. ANTENNAS AND WAVE PROPAGATION. (3)

Three hours of lecture per week. Corequisite, EN EE 134. Review of Maxwell's equations; radiation; antennas; radio wave propagation. (Reed.)

### EN EE 182. INTRODUCTION TO SEMICONDUCTOR PHYSICAL ELECTRONICS. (3)

Three hours of lecture per week. Prerequisites, EN EE 132 and Physics 153, or equivalents. Basic properties of semiconductors; idealized p-n junction and transistor theory; d-c parameters; low-frequency characteristics; transistors as amplifiers and as switches; field effect transistors; integrated circuit considerations; other junction devices. (Tompkins.)

**EN EE 184. PHYSICAL ELECTRONICS OF VACUUM AND GASEOUS DEVICES. (3)**

Three hours of lecture per week. Prerequisites, EN EE 132 and Physics 153, or equivalents. Essential principles of quantum mechanics and quantum statistics; electron emission; electrons in electric and magnetic fields; space charge effects; vacuum tubes; electron beams; gas discharges and plasmas in electronic devices. (Reiser.)

**EN EE 186. PARTICLE ACCELERATORS, PHYSICAL AND ENGINEERING PRINCIPLES. (3)**

Three hours of lecture per week. Prerequisites, EN EE 132 and Physics 153, or consent of the instructor. Sources of charged particles; methods of acceleration and focusing of ion beams in electromagnetic fields; basic theory, design, and engineering principles of particle accelerators. (Reiser.)

**CIRCUITS AND CONTROL SYSTEMS****EN EE 120. CIRCUIT ANALYSIS II. (4)**

Four hours of lecture per week. (See EN EE 121 for related laboratory course.) Prerequisite, EN EE 90. Corequisites, EN EE 121, Math. 66. Required of juniors in electrical engineering. Continuation of EN EE 90. Complex frequency and frequency response; application of both frequency-domain and time-domain concepts; mutual inductance and transformers; polyphase concept; Fourier and Laplace transform methods; driving point and transfer functions; controlled sources. (Basham.)

**EN EE 121. CIRCUIT LABORATORY II. (1)**

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 120. Required of juniors in electrical engineering. Laboratory to be taken in association with EN EE 120. Steady-state and transient circuit measurements; frequency response. (Pugsley.)

**EN EE 122. ELECTRONIC CIRCUITS I. (4)**

Four hours of lecture per week. (See EN EE 123 for related laboratory course.) Prerequisite, EN EE 120. Corequisites, EN EE 123, and EN EE 130. Required of juniors in electrical engineering. Transistors and electron tubes in dc, pulse, and small-signal situations; analysis of basic amplifiers; biasing; basic electronic switches; tuned and wide-band amplifiers, feedback. EN EE 124 continues where EN EE 122 ends. (Simons.)

**EN EE 123. ELECTRONICS LABORATORY I. (1)**

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 122. Required of juniors in electrical engineering. Laboratory to be taken in association with EN EE 122. Transistor and vacuum-tube characteristics; basic electronic switches; amplifiers; design practice. To the extent possible, work will be individual or in two-man squads. (Simons.)

**EN EE 124. ELECTRONIC CIRCUITS II. (4)**

Four hours of lecture per week. (See EN EE 125 for related laboratory course.) Prerequisite, EN EE 122. Corequisites, EN EE 132, EN EE 123, and EN EE 125. Required of seniors in electrical engineering. Continuation of EN EE 122. Electron tubes and transistors in continuous-wave and pulse applications. Class C circuits; modulation and detection; pulse generation, delay, and storage; feedback amplifiers. (Simons.)

## ELECTRICAL ENGINEERING

### EN EE 125. ELECTRONICS LABORATORY II. (1)

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 124. Required of seniors in electrical engineering. Laboratory to be taken in association with EN EE 124. Specification and design of electronic circuits. Students work as individuals or as responsible members of a project team.

(Simons.)

### EN EE 144. ELECTRONIC CIRCUITS. (3)

Three hours of lecture per week. Prerequisite, EN EE 60 or equivalent knowledge of circuit theory or consent of the instructor. This course is intended for students in the Physical Sciences, and for engineering students requiring additional study of electronic circuits. Credit not normally given for this course in an electrical engineering major program. (EN EE 123 or 125 may optionally be taken as an associated laboratory, as is appropriate.) P-n junctions; transistors; vacuum tubes; biasing and operating-point stability; switches; large-signal analysis; models; small-signal analysis; frequency response; feedback and multistage amplifiers; pulse and digital circuits.

(Simons.)

### EN EE 146. ELECTRONICS FOR LIFE SCIENTISTS. (3)

Two hours of lecture and two hours of laboratory per week. Laboratory fee, \$5.00. Prerequisites, college algebra and a physics course, including basic electricity and magnetism. Not accepted for credit in an electrical engineering major program. The concept of an instrumentation system with emphasis upon requirements for transducers, amplifiers, and recording devices; design criteria and circuitry of power supplies, amplifiers, and pulse equipment; specific instruments used for biological research; problems of shielding against hum and noise pickup and other interference problems characteristic of biological systems.

(Ferris.)

### EN EE 148. ELECTRONIC INSTRUMENTATION FOR PHYSICAL SCIENCE. (3)

Two hours of lecture and two hours of laboratory per week. Laboratory fee, \$5.00. EN EE 60 or 120, Physics 104 or equivalent, or consent of the instructor. The concept of instrumentation systems from sensor to readout; discussion of transducers; system dynamics, precision, and accuracy; measurement of electrical parameters; direct, differential, and potentiometric measurements; bridge measurements; time and frequency measurements; waveform generation and display.

(Ferris.)

### EN EE 150. NETWORK SYNTHESIS. (3)

Three hours of lecture per week. Prerequisite, EN EE 120. Positive real functions; synthesis of driving-point impedances; network functions; approximation methods; Chebyshev and Butterworth filters.

(Basham.)

### EN EE 154. FEEDBACK CONTROL SYSTEMS. (3)

Three hours of lecture per week. Prerequisites, Math. 66 and EN EE 122. (See EN EE 155 for related laboratory course.) Feedback system operation and design; stability criteria; basic design techniques; correlation of time and frequency-domain concepts; flow-graph algebra; system synthesis to a variety of specifications.

(Larson.)

## ELECTRICAL ENGINEERING

### EN EE 155. FEEDBACK CONTROL SYSTEMS LABORATORY. (1)

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 154. Projects to enhance the student's understanding of feedback control systems and familiarize him with some of the devices used in the control field.

(Price.)

### EN EE 172. ADVANCED PULSE TECHNIQUES. (3)

Three hours of lecture per week. (See EN EE 173 for related laboratory course.) Prerequisite, EN EE 124 or EN EE 144 or equivalent. Bistable, monostable, and astable circuits; sweep circuits; synchronization; counting; gates; comparators; magnetic core circuits; semiconductor and vacuum-tube circuits.

(Schulman.)

### EN EE 173. PULSE TECHNIQUES LABORATORY. (1)

Two hours of laboratory per week. Laboratory fee, \$5.00. Corequisite, EN EE 172, or EN EE 164 and permission of the instructor. Experiments on switching circuits; bistable, monostable, and astable circuits; sweep circuits; gates; comparators.

(Simons.)

### EN EE 174. ADVANCED RADIO ENGINEERING. (3)

Three hours of lecture per week. Corequisite, EN EE 124. (See EN EE 175 for related laboratory course.) The coupling coefficient concept; high-frequency effects; design and optimization of amplifiers; stability considerations; gain limitations; noise figure; design of harmonic generators; design of stable oscillators.

(Wagner.)

### EN EE 175. ADVANCED RADIO ENGINEERING LABORATORY. (1)

Two hours of laboratory per week. Laboratory fee \$5.00. Corequisite, EN EE 174. Experiments on multiple tuned amplifiers, noise figure measurements; class-C amplifiers; varactors; oscillators; modulators. Projects.

(Friedman.)

### EN EE 190. MATHEMATICAL FOUNDATIONS OF CIRCUIT THEORY. (3)

Three hours of lecture per week. Prerequisites, EN EE 120 and Math. 22, or equivalent. Review of determinants; linear equations; matrix theory; eigenvalues; theory of complex variables; inverse Laplace transforms. Applications are drawn primarily from circuit analysis.

(Marcovitz.)

## INFORMATION SCIENCES

### EN EE 142. ENGINEERING PROBABILITY. (2)

Two hours of lecture per week. Prerequisites, Math. 22 and EN EE 90. Required of electrical engineering majors. Probability theory, discrete and continuous; statistical distribution functions and their parameters; applications to electrical engineering.

(Ginnings.)

### EN EE 158. SIGNAL ANALYSIS, MODULATION, AND NOISE. (3)

Three hours of lecture per week. Prerequisites, EN EE 122 and EN EE 142. Signal transmission through networks; transmission in the presence of noise; statistical methods of determining error rate and transmission effects; modulation schemes.

(Price.)

## ELECTRICAL ENGINEERING

### EN EE 160. ELECTRONIC ANALOG COMPUTERS. (3)

Three hours of lecture per week; occasional laboratory. Prerequisites, EN EE 62 or 122 or 144 or equivalent, and Math. 66 or equivalent. Programming the analog computer; analog computing components; error analysis; repetitive operations; synthesis of systems using the computer; hybrid computer systems. (Chu.)

### EN EE 162. LOGIC OF DIGITAL COMPUTERS. (3)

Two hours of lecture and two hours of laboratory per week. Laboratory fee, \$5.00. Prerequisites, Math. 21, EN EE 80, or equivalent. Symbolic logic and Boolean algebra; switching circuits; simplification; binary and other number representations and codes; storage elements defined logically; basic sequential circuits; digital systems. (Pugsley.)

### EN EE 164. DIGITAL COMPUTER TECHNOLOGY. (3)

Three hours of lecture per week. (See EN EE 173 for related laboratory.) Prerequisites, EN EE 62 or 122 or 144, and EN EE 162. Organization of electronic digital computers; electronic subassemblies; integrated circuits; digital storage; digital and analog magnetic recording; analog-digital conversion. (Tompkins.)

## SPECIAL TOPICS

### EN EE 180. TOPICS IN ELECTRICAL ENGINEERING. (3)

Prerequisite, permission of the instructor. May be taken for repeated credit up to a total of 6 credits, with the permission of the student's advisor and the instructor. Selected topics from the literature of modern electrical engineering. (Staff.)

### EN EE 181. PROJECTS IN ELECTRICAL ENGINEERING. (2)

Hours to be arranged. Laboratory fee, \$10.00. Prerequisites, senior standing and permission of the instructor. May be taken for repeated credit up to a total of 4 credits, with the permission of the student's advisor and the instructor. Theoretical and experimental projects. (Staff.)

### *For Graduates*

## ELECTROMAGNETICS AND PHYSICAL ELECTRONICS

### EN EE 201. ELECTROMAGNETIC THEORY. (3)

Two lectures per week. Prerequisite, EN EE 134 or 170 or 215, or equivalent. Theoretical analysis and engineering applications of Laplace's, Poisson's, and Maxwell's equations. (Hochuli.)

### EN EE 206, 207. MICROWAVE ENGINEERING. (3, 3)

Two lectures, or one lecture and one laboratory, per week. Prerequisite, EN EE 201 or EN EE 216. Laboratory fee, EN EE 207, \$5.00. Basic considerations in solving field problems using differential equations; circuit concepts and their validity at high frequency; guided electromagnetic waves; principles of masers and lasers; propagation and diffraction, including the optical region. Fundamental experiments at microwave and optical frequencies. (Hochuli.)

### EN EE 215, 216. RADIO WAVE PROPAGATION. (3, 3)

Two lectures per week. Prerequisite, undergraduate degree in electrical engineering, physics, or mathematics. Maxwell's wave equation; concept of retarded

## ELECTRICAL ENGINEERING

magnetic vector potential; propagation over plane earth; propagation over spherical earth; refraction; meteorological effects; complex antennas; air-to-air propagation; lobe modulation. (Reed.)

### EN EE 245. ELECTRICAL TECHNIQUES IN MEDICINE AND BIOLOGY. (3)

Two lectures per week. Prerequisite, mathematics through differential equations and physics through electricity and magnetism, or equivalent. Electrical properties of biological tissues and cell suspensions; alternating-current impedance spectroscopy; transducers and related instrumentation systems for biological measurements; biological control systems; interaction of electromagnetic fields with biological systems. (Ferris.)

### EN EE 250. MATHEMATICS FOR ELECTROMAGNETISM. (3)

Two lectures per week. Prerequisite, undergraduate preparation in electromagnetic theory and advanced calculus. Tensors and curvilinear coordinates; partial differential equations of electrostatics and electrodynamics; functionals, integral equations, and calculus of variations as applied to electromagnetism. (Rutelli.)

### EN EE 251. ANTENNA THEORY. (3)

Two lectures per week. Prerequisite, EN EE 250 or equivalent. Review of Maxwell's equations; radiative networks; linear antennas; antenna arrays; aperture antennas; slot antennas; advanced topics. (Rutelli.)

### EN EE 280. ELECTRONIC PROPERTIES OF SEMICONDUCTORS. (3)

Three hours per week. Prerequisites, EN EE 182, or Math. 66 and Phys. 53, or equivalents. Properties of crystals; elementary topics from quantum mechanics; energy bands; electron transport theory; conductivity and Hall effect; statistical distributions; Fermi Level; impurities; non-equilibrium carrier distributions; normal modes of vibration; effects of high electric fields; p-n junction theory, avalanche breakdown; tunneling phenomena; surface properties. (Bullis.)

### EN EE 282. TECHNOLOGY OF SEMICONDUCTOR DEVICES AND MATERIALS. (3)

Three hours per week. Prerequisites, EN EE 182 or Phys. 53 or EN EE 280. Basic processes involved in the fabrication of transistors and other semiconductor devices; crystal growth and epitaxy; crystal orientation; purification and doping of crystals; diffusion; electrical and optical properties; photo-resist techniques; oxide passivation; contacts; device assembly and packaging. Emphasis is on silicon but other materials of engineering significance are considered. (Bullis.)

### EN EE 290. CHARGED PARTICLE DYNAMICS, ELECTRON AND ION BEAMS. (3)

Three hours per week. Prerequisite, consent of the instructor. General principles of single-particle dynamics; mapping of electric and magnetic fields; equation of motion and methods of solution; production and control of charged particle beams; electron optics; Liouville's theorem; space charge effects in high current beams; design principles of special electron and ion beam devices. (Reiser.)

## ELECTRICAL ENGINEERING

### CIRCUITS AND CONTROL SYSTEMS

#### EN EE 202, 203. TRANSIENTS IN LINEAR SYSTEMS. (3, 3)

Two lectures per week. Prerequisite, undergraduate major in electrical or mechanical engineering or physics. Operational circuit analysis; the Fourier integral; transient analysis of electrical and mechanical systems and electronic circuits by the Laplace transform method. (Wagner.)

#### EN EE 204. ADVANCED ELECTRONIC CIRCUIT DESIGN. (3)

Two lectures per week. Prerequisites, EN EE 124 or consent of the instructor. Comparison of bipolar and field effect transistors; detailed frequency response of single and multistage amplifiers; design of feedback amplifiers; d-c coupling techniques; design of multistage tuned amplifiers. (Simons.)

#### EN EE 212, 213. SERVOMECHANISMS. (3, 3)

Two lectures per week. Prerequisites, EN EE 154 and EN EE 202, or equivalent. Linear control systems with deterministic and stochastic inputs; nonlinear control systems; time and frequency-domain techniques. (Price.)

#### EN EE 230. MATHEMATICS OF CIRCUIT ANALYSIS. (3)

Two lectures per week. Prerequisite, undergraduate circuit theory and advanced calculus. Determinants; linear equations; matrix theory; eigenvalues; theory of complex variables; inverse Laplace transforms; applications to circuit analysis. (Marcovitz.)

#### EN EE 232, 233. NETWORK SYNTHESIS. (3, 3)

Two lectures per week. Prerequisite, EN EE 234 or equivalent. Design of driving-point and transfer impedance functions with emphasis on the transfer loss and phase of minimum-phase networks; flow diagrams; physical network characteristics, including relations existing between the real and imaginary components of network functions; modern methods of network synthesis. (Basham.)

#### EN EE 234. GRAPH THEORY IN NETWORK ANALYSIS. (3)

Two lectures per week. Prerequisite, EN EE 230. Linear graph theory as applied to electrical networks; cut sets and tie sets; incidence matrices; trees, branches, and mazes; development of network equations by matrix and index notation; network characteristic equations for natural circuit behavior; signal-flow-graph theory and Mason's rule; stability of active two-port networks. (Wagner.)

#### EN EE 235. APPLICATIONS OF TENSOR ANALYSIS. (3)

Two lectures per week. Prerequisite, EN EE 202 or EN EE 230. The mathematical background of tensor notation which is applicable to electrical engineering problems. Applications of tensor analysis to electric-circuit theory and to field theory. (Wagner.)

#### EN EE 238. SAMPLED-DATA CONTROL SYSTEMS. (3)

Two lectures per week. Prerequisite, undergraduate or graduate preparation in linear feedback control theory. Z-transform and modified Z-transform method of analysis; root-locus and frequency-response methods of analysis; discrete and continuous compensation; analysis with finite pulse width; digital control systems. (Price.)

**EN EE 284. SEMICONDUCTOR DEVICE MODELS. (3)**

Two lectures per week. Prerequisite, EN EE 182 and EN EE 234, or equivalents. Single-frequency models for transistors; small-signal and wide-band models for general non-reciprocal devices; hybrid- $\pi$  and tee models for transistors; relationship of models to transistor physics; synthesis of wide-band models from terminal behavior; computer utilization of models; models for other semiconductor devices. (Tompkins.)

**INFORMATION SCIENCES****EN EE 218, 219. SIGNAL ANALYSIS AND NOISE. (3, 3)**

Two lectures per week. Prerequisite, equivalent to EN EE 158. Mathematical description of noise; spectral analysis; noisy signal detection; optimum linear systems. (Ginnings.)

**EN EE 220. STATISTICAL COMMUNICATION THEORY. (3)**

Two lectures per week. Prerequisite, EN EE 219. Statistical description of signals; testing statistical hypotheses; likelihood testing; statistical estimation of signal parameters. (Ginnings.)

**EN EE 221. INFORMATION THEORY. (3)**

Two lectures per week. Prerequisite, Math. 133 or equivalent. Information measure; channels; source encoding; error-correcting codes. (Marcovitz.)

**EN EE 262. SWITCHING THEORY I. (3)**

Two lectures per week. Prerequisite, EN EE 162 or consent of instructor. Applications of Boolean algebra to combinational switching circuits; symmetric functions; majority and threshold networks; function decomposition; minimization; prime implicants and algorithms for finding them; minimal and nearly minimal covers. (Pugsley.)

**EN EE 263. SWITCHING THEORY II. (3)**

Two lectures per week. Prerequisite, EN EE 262 or consent of instructor. Models for sequential machines; equivalence; state minimization; incompletely specified machines; linear sequential machines; regular expressions, partitions, and state assignment. (Pugsley.)

**EN EE 270. DIGITAL COMPUTER DESIGN. (3)**

Two lectures per week. Prerequisite, EN EE 162 or equivalent. Introduction to design techniques for digital computers; review of Boolean algebra; digital arithmetic; logic circuits; digital memories; design of computer elements, arithmetic unit, and control unit. A simple digital computer will actually be designed during the course. (Chu.)

**EN EE 272. ADVANCED DIGITAL COMPUTER DESIGN. (3)**

Two lectures per week. Prerequisites, EN EE 270 or equivalent; knowledge of computer programming. Computer design languages; computer organization; computer design by language translation; integrated logic circuit design; digital memories including read-only and associative memories; case studies of computer designs. (Chu.)

## ENGINEERING SCIENCES

### EN EE 274. DIGITAL SYSTEMS ENGINEERING. (3)

Two lectures per week. Prerequisite, EN EE 270. Systems aspects of digital-computer-based systems; data-flow analysis; system organization; control languages; consoles and displays; remote terminals; software-hardware tradeoff; system evaluation; case studies from selected applications areas such as data acquisition and reduction, information storage, or the like. (Pugsley.)

### EN EE 276. COMPUTERS FOR DIFFERENTIAL EQUATION SOLUTION. (3)

Two lectures per week. Prerequisite, EN EE 162, knowledge of elementary differential equations, numerical methods, and programming. Mechanistic methods for differential equation solution; application of analog or hybrid computers for the purpose; digital differential analyzers; digital-analog simulation on a general-purpose digital computer; MIMIC Language and examples of its use. Class will run simulation program on an IBM 7094 or similar computer. (Chu.)

## SPECIAL TOPICS AND RESEARCH

### EN EE 222. GRADUATE SEMINAR. (1-3)

Prerequisite, consent of instructor. Seminars are held on topics such as microwave engineering, radiation engineering, non-linear circuit analysis, modern control theory, artificial intelligence, and other topics of current interest. May be taken for repeated credit. (Basham.)

### EN EE 223. ADVANCED TOPICS IN ELECTRICAL ENGINEERING. (3)

Prerequisite, permission of the instructor. Selected topics from the current literature of electrical engineering. May be taken for repeated credit. (Basham.)

### EN EE 399. ELECTRICAL ENGINEERING RESEARCH.

Prerequisite, consent of thesis supervisor. Six semester hours of credit in EN EE 399 are required of M.S. degree candidates and a minimum of eighteen semester hours are required of Ph.D. candidates. A thesis covering an approved research problem and written in conformity with the regulations of the Graduate School is a partial requirement for either the degree of Master of Science or the degree of Doctor of Philosophy in electrical engineering. (Basham.)

## ENGINEERING SCIENCES

### EN ES 1. INTRODUCTORY ENGINEERING SCIENCE. (4)

First and second semesters. Two lectures and two laboratory periods a week. Prerequisite, concurrent registration in Math. 19 (or approval by department head). Basic "languages" of the engineer. Elements of graphic communication and analysis. Orthographic projection and descriptive geometry; conventions; graphs and curve-fitting. Vectors as tools of communication and analysis. Applications to geometry of engineering problems. (Elkins and Staff.)

**EN ES 10. MECHANICS. (4)**

First and second semesters. Three lectures and two drill periods a week. Prerequisites, E. S. 1 and concurrent registration in Math. 20 (or approval of department head). Systems of rigid bodies in equilibrium under action of forces and couples. Numerical, graphical, and vectorial computation applied to problems in statics and elementary dynamics. (Wockenfuss and Staff.)

**EN ES 20. MECHANICS OF MATERIALS. (3)**

First and second semesters. Three lectures a week. Prerequisites, Math. 20, Phys. 20 (or concurrent registration in Math. 21, Phys. 20) and EN ES 10. Distortion of engineering materials in relation to changes in stress or temperature. Geometry of internal strain and external displacement. Elementary application to beams, columns, shafts, tanks, trusses, and connections. (Lepper and Staff.)

**EN ES 21. DYNAMICS. (3)**

First and second semesters. Three lectures a week. Prerequisites, EN ES 10; concurrent registration in Math. 21 and Phys. 20 (with which subject matter is coordinate and applied to engineering problems). Systems of heavy particles and rigid bodies at rest and in motion. Force-acceleration, work-energy, and impulse-momentum relationships. Motion of one body relative to another in a plane and in space. (Hayleck and Staff.)

**EN ES 30. MATERIALS SCIENCE. (3)**

First and second semesters. Three lectures a week. Prerequisite, E. S. 20. Basic principles, nature, and properties of engineering materials. Structure of matter, phase transformations and mechanical properties of metals, ceramics, polymers and related materials; electrical, thermal and magnetic properties, corrosion and radiation damage, friction and wear, diffusion. (Jackson, Asimow, and Dawson.)

**MECHANICAL ENGINEERING**

*Professors:* SHREEVE, JACKSON, R. W. ALLEN, MAVIS, SAYRE, TALAAT,

*Associate Professors:* HAYLECK, EYLER, WOCKENFUSS, ASIMOW, BERGER, CUNNIFF, JOHN

*Assistant Professors:* ELKINS, YANG, ANAND, MARKS, WALSTON

*Instructors:* BECKER, BROWNE, MCAULIFFE, KRAFT, GLASS, BUCKLEY, LUPIEN, KISIELEWSKI, DEVORE, HASPERT, MORIN, OWENS, PUCKETT, WERNETH

*Lecturers:* SEIGEL, HABERMAN, MEYERSON, DAWSON

*For Undergraduates*

**EN ME 1. THERMODYNAMICS I. (3)**

Second semester. Two lectures and one laboratory period a week. Prerequisites, Physics 20; Math. 21 concurrently. Required of sophomores in mechanical and aeronautical engineering. Properties, characteristics, and fundamental equation

## MECHANICAL ENGINEERING

of gases, and vapors. Application of first and second laws of thermodynamics in the analysis of basic heat engines, air compression, and vapor cycles. Flow and non-flow processes for gases and vapors. (Eyler and Staff.)

### *For Advanced Undergraduates and Graduates*

#### EN ME 100. THERMODYNAMICS. (3)

First semester. Two lectures and one laboratory period a week. Prerequisites, Phys. 20, Math. 21, concurrently. The properties, characteristics, and fundamental equations of gases, and vapors. Application of the first and second laws of thermodynamics in the analysis of basic heat engines, air compression, and vapor cycles. Flow and non-flow processes for gases and vapors. (Eyler, Sayre.)

#### EN ME 101. DYNAMICS OF MACHINERY. (2)

First semester. One lecture and one laboratory period a week. Prerequisites, E. S. 21; Math. 64 concurrently. Kinematics of mechanisms, and dynamic characteristics of machinery with emphasis on systems with single degree of freedom. (Hayleck, McAuliffe.)

#### EN ME 102. FLUID MECHANICS I. (3)

First and second semesters. Two lectures and one laboratory period a week. Prerequisite, M. E. 1. Lab. fee, \$3.00. A rational study of fluids at rest and in motion. Principles of viscous and turbulent flow in pipes, nozzles, etc. Impulse and momentum. Pumps, turbines, and meters. Dimensional analysis and laws of similarity. (Sayre, John.)

#### EN ME 103. MATERIALS ENGINEERING. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisite, E. S. 30. Laboratory fee, \$8.00. Processes and methods to manufacture and usefully apply engineering materials; alloys and heat treatment of steel; strengthening processes for ferrous and non-ferrous alloys. Fabrication techniques for metals, polymers, and refractories. Specification, inspection, control and automation. (Jackson, Asimow.)

#### EN ME 104. GAS DYNAMICS. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisite, M. E. 102. Compressible flow in ducts and nozzles; effect of area change, heat addition, friction, and normal shocks. Thermodynamics of chemically reacting flows, combustion and equilibrium. (Sayre, John.)

#### EN ME 105. PRINCIPLES OF MECHANICAL ENGINEERING. (3)

Second semester. Three lectures a week. Prerequisites, Phys. 21, Math 21. Required of seniors in civil engineering. Elementary thermodynamics and the study of heat, fuel and combustion in the production and use of steam for generation of power. Laboratory tests and trips to industrial plants. (Marks, Glass.)

#### EN ME 106. TRANSFER PROCESSES. (3)

First and second semesters. Three lectures a week. Prerequisite, M. E. 102. Conduction by steady state and variable heat flow; laminar and turbulent flow; free and forced convection; radiation, evaporation and condensation of vapors. Analogy between the transfer of mass, heat, and momentum. (Allen, Eyler.)

## EN ME 107. ENERGY CONVERSION. (4)

Second semester. Three lectures and one laboratory a week. Prerequisite, M. E. 100. Laboratory fee, \$3.00 per semester. Required of seniors in electrical engineering. Chemical, heat, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Direct conversion processes of fuel cells, thermionics, and magnetohydropower. (Allen, John, Talaat.)

## EN ME 116. APPLIED MATHEMATICS IN ENGINEERING. (3)

Prerequisite, Math. 21. Mathematical techniques applied to the analysis and solution of engineering problems. Use of differentiation, integration, differential equations, partial differential equations and integral transforms. Application of infinite series, numerical and statistical methods. (Yang, Walston.)

## EN ME 120. MEASUREMENTS LABORATORY. (2)

Second semester. One lecture and one laboratory period a week. Prerequisites, EN ES 30, M. E. 101, and EN EE 60, EN ME 106 concurrently. Laboratory fee, \$8.00. Required of juniors in Mechanical Engineering. Measurements and measurement systems; applications of selected instruments with emphasis on interpretation of results. (Allen, Sayre.)

## EN ME 140. ENGINEERING ANALYSIS AND COMPUTER PROGRAMMING. (3)

Second semester. Three lectures a week. Prerequisite, Math. 66 or EN ME 116. Elements of operational calculus, vector analysis; numerical methods and programming for computers. Errors, interpolation, series, integration, iteration and solution of equations. (Sayre, Berger.)

## EN ME 150, 151. ENERGY CONVERSION. (4, 3)

First semester. Three lectures, one laboratory a week. Second semester. Two lectures, one laboratory a week. Prerequisites, EN ME 103, EN ME 104, EN ME 106. Chemical, heat, mechanical, nuclear and electrical energy conversion processes, cycles and systems. Reciprocating, turbo- and jet-propulsion power plants and components using all types of heat and reaction sources. Direct conversion processes of fuel cells, thermionics and magnetohydropower. (Shreeve, Allen, John.)

## EN ME 152. MACHINE DESIGN. (3)

First semester. Two lectures and one laboratory period a week. Prerequisites, EN ME 101, 103. Working stresses, stress concentration, stress analysis and repeated loadings. Design of machine elements. Multidegree vibration systems. (Hayleck, Jackson.)

## EN ME 153. ELASTICITY AND PLASTICITY I. (3)

Second semester. Three lectures a week. Prerequisite, EN ME 152. Analysis of plates and shells, thick walled cylinders, columns, torsion of non-circular sections, and rotating disks. (Jackson, Hayleck, Berger.)

## EN ME 154, 155. ENGINEERING EXPERIMENTATION. (2, 2)

First and second semesters. One lecture and one laboratory period a week. Prerequisite, senior standing in Mechanical Engineering. Laboratory fee, \$8.00 per semester. Theory of experimentation. Selected experiments emphasize planned procedure, analysis and communications of results, analogous systems and leadership. (Allen, Sayre.)

## MECHANICAL ENGINEERING

### EN ME 156, 157. MECHANICAL ENGINEERING ANALYSIS AND DESIGN. (3, 4)

First semester, two lectures, one laboratory period per week; second semester, two lectures and two laboratory periods per week. Prerequisite, senior standing in Mechanical Engineering. Creative engineering and problem analysis. Systems design including control, reliability and manufacturing requirements. Use of computers in design. Design of multi-variable systems.

(Sayre, Cuniff, Berger, Glass.)

### EN ME 161. ENVIRONMENTAL ENGINEERING. (3)

Second semester. Three lectures a week. Prerequisites, EN ME 101, 106, senior standing in Mechanical Engineering. Heating and cooling load computations. Thermodynamics of refrigeration systems. Low temperature refrigeration. Problems involving extremes of temperature, pressure, acceleration and radiation.

(Marks, Eyler.)

### EN ME 162. DYNAMICS II. (3)

Three lectures a week. Prerequisites, EN ME 101, Math. 66 or EN ME 116, senior standing in Mechanical Engineering. Linear and non-linear plane and three-dimensional motion, moving axes, Lagrange's equation, Hamilton's principle, non-linear vibration, gyroscope, celestial mechanics. (Hayleck, Cuniff.)

### EN ME 163. FLUID MECHANICS II. (3)

Three lectures a week. Prerequisites, EN ME 104, EN ME 106, senior standing. Hydrodynamics with engineering applications. Stream function and velocity potential; conformal transformations; pressure distributions; circulation; numerical methods and analogies.

(John, Sayre.)

### EN ME 164. THERMODYNAMICS II. (3)

Three lectures a week. Prerequisites, EN ME 104, EN ME 106, senior standing. Applications to special systems, change of phase, low temperature. Statistical concepts, equilibrium, heterogeneous systems.

(Eyler, Allen.)

### EN ME 165. AUTOMATIC CONTROLS. (3)

Three lectures per week. Prerequisites, EN EE 62, senior standing. Hydraulic, electrical, mechanical and pneumatic automatic control systems. Open and closed loops. Steady state and transient operation, stability criteria, linear and non-linear systems. Laplace transforms.

(Shreeve, Yang.)

### EN ME 166. SPECIAL PROBLEMS. (3)

Three lectures a week. Prerequisite, senior standing in Mechanical Engineering. Advanced problems in mechanical engineering with special emphasis on mathematical and experimental methods.

(Staff.)

### EN ME 167. OPERATIONS RESEARCH I. (3)

Three lectures a week. Prerequisite, senior standing in Mechanical Engineering. Applications of linear programming, queuing model, theory of games and competitive models to engineering problems.

### EN CH 170. STRUCTURE AND PROPERTIES OF ENGINEERING MATERIALS (3)

A comprehensive survey of the atomic and electronic structure of solids with emphasis on the relationship of structure to the physical and mechanical properties.

**EN CH 171. PHYSICAL CHEMISTRY OF ENGINEERING MATERIALS. (3)**  
 Equilibrium multicomponent systems and relationship to the phase diagram. Thermodynamics of polycrystalline and polyphase materials. Diffusion in solids, kinetics of reactions in solids.

**EN CH 172. TECHNOLOGY OF ENGINEERING MATERIALS. (3)**  
 Relationship of properties of solids to their engineering applications. Criteria for the choice of materials for electronic, mechanical and chemical properties. Particular emphasis on the relationships between structure of the solid and its potential engineering application.

**EN CH 173. PROCESSING OF ENGINEERING MATERIALS. (3)**  
 The effect of processing on the structure of engineering materials. Processes considered include refining, melting and solidification, purification by zone refining, vapor phase processing, mechanical working and heat treatments.

## *For Graduates*

**EN ME 200, 201. ADVANCED DYNAMICS. (3, 3)**  
 First and second semesters. Prerequisites, EN ES 21, Math. 66 or EN ME 116, EN ME 152, EN ME 157, Mechanics of machinery. Dynamic force. Balancing of rotating parts. Vibrations and vibration damping. Critical speeds (Cunniff.)

**EN ME 202, 203. APPLIED ELASTICITY. (3, 3)**  
 First and second semesters. Prerequisites, EN ES 20, Math 66 or EN ME 116, EN ME 153. Advanced methods in structural and experimental stress analysis involving beam problems, curved bars, thin plates and shells, buckling of bars, plates and shells. Stress concentrations, plastic deformations, and problems involving instability of structures. (Berger.)

**EN ME 204, 205. ADVANCED THERMODYNAMICS. (3, 3)**  
 First and second semesters. Three lectures a week. Prerequisites, EN ME 104, EN ME 106, EN ME 151. Advanced problems in thermodynamics on compression of gases and liquids, combustion and equilibrium, humidification and refrigeration and availability. Statistical thermodynamics, partition functions, irreversible processes. Transport phenomena. (Shreeve, Allen.)

**EN ME 206, 207. ADVANCED MACHINE DESIGN. (3, 3)**  
 First and second semesters. Three lectures a week. Prerequisites, Math. 66 or EN ME 116, EN ME 152, EN ME 157. Design of special stationary and moving parts, including rotating disk, bearings, thick wall cylinders, screw fastenings, crankshafts, etc. Synthesis of materials properties and characteristics as related to stress analysis in mechanical design concepts. (Jackson.)

**EN ME 208, 209. DESIGN OF TURBOMACHINERY. (3, 3)**  
 First and second semesters. Prerequisite, EN ME 151. Characteristics and design of turbines, pumps, compressors and torque converters; cavitation, stall, and surge. (Shreeve.)

**EN ME 210, 211. ADVANCED FLUID MECHANICS. (3, 3)**  
 First and second semesters. Prerequisites, EN ME 102, Math. 66 or EN ME 116. Potential flow theory; three dimensional flow examples; application of complex

## MECHANICAL ENGINEERING

variables to two-dimensional flow problems; Blasius theorem, circulation and Joukowski hypothesis, engineering applications to cavitation and calculation of pressure distribution; viscous flow and boundary layer. (Sayre, Haberman.)

### EN ME 212, 213. ADVANCED VIBRATIONS. (3, 3)

First and second semesters. Prerequisite, EN ME 157. Review of single and multi-degrees of freedom. Laplace methods. Effects of pulse shape on response of linear and non-linear systems; friction, hysteresis and variable damping. (Seigel, Cunniff.)

### EN ME 214, 215. STRESS WAVES IN CONTINUOUS MEDIA. (3, 3)

First and second semesters. Prerequisite, EN ME 152 and EN ME 157. Methods of characteristics applied to transient phenomena in solids and fluids. Elastic and plastic waves under impact. Shock formation and strain rate effects. (Seigel, Cunniff.)

### EN ME 216, 217. ENERGY CONVERSION-SOLID STATE. (3, 3)

First and second semesters. Prerequisite, EN ME 151. Combustion, thermoelectric, thermionic, fuel cells, reactors, magnetohydrodynamics. Kinetics of reactions, fission and fusion. (Talaat, Shreeve.)

### EN ME 218, 219. ENERGY CONVERSIONS-SOLID STATE. (3, 3)

First and second semesters. Prerequisite, EN ME 151. Design parameters in chemical, nuclear and direct conversion systems for the production of power; weight, efficiency and radiation. (Talaat, Shreeve.)

### EN ME 220. SEMINAR.

Credit in accordance with work outlined by mechanical engineering staff. Prerequisite, graduate standing in mechanical engineering. (Staff.)

### EN ME 223, 224. THEORY OF PLASTICITY. (3, 3)

First and second semesters. Prerequisite, EN ME 153. Yield criteria and associated flow rules in the theory of elastic-plastic solids, including perfectly plastic, elastic-plastic and strain-hardening materials. Torsion, plane problems and three-dimensional problems in plasticity. (Berger, Jackson.)

### EN ME 227, 228. THEORY OF ELASTICITY. (3, 3)

First and second semesters. Three lectures a week. Prerequisites, EN ME 202, 203. Stress and strain at a point. Relation between stresses and strains, general equations of elasticity, plane strain and plane stress, torsion, bending, axially symmetric distribution of stress, plates, thermal stresses, strain energy and approximate methods. (Berger.)

### EN ME 229, 230. JET PROPULSION. (3, 3)

First and second semesters. Three lectures a week. Prerequisites, EN ME 150, EN ME 151. Types of thermal jet units. Fluid reaction and propulsive efficiency. Performance of rockets, aerothermodynamics, combustion chemical kinetics, aerodynamics of high speed air flow. Solid and liquid propellant rockets. Design of turbojets and aerojets, ramjets and hydroduct units, including combustion chambers, turbines and compressor. (Shreeve.)

**EN ME 231, 232. ADVANCED HEAT TRANSFER. (3, 3)**

First and second semesters. Three lectures a week. Prerequisites. EN ME 150, EN ME 151. Advanced problems covering effects of radiation, conduction, convection, evaporation and condensation. Study of research literature on heat transfer. (Shreeve, Allen.)

**EN ME 233, 234. COMPRESSIBLE FLOW. (3, 3)**

First and second semesters. Prerequisite, EN ME 104, Math. 66 or EN ME 116, EN ME 212. One dimensional subsonic and supersonic flow; compressible flow in ducts and nozzles; two and three dimensional subsonic and supersonic flow; similarity rules, normal and oblique shock waves. (Sayre, Haberman.)

**EN ME 350. STRUCTURE OF ENGINEERING MATERIALS. (3)**

The structural aspects of crystalline and amorphous solids and relationship to bonding types. Point and space groups. Summary of diffraction theory and practice. The Reciprocal Lattice. Relationships of the macroscopically measured properties to crystal symmetry. Structural aspects of defects in crystalline solids.

**EN ME 351. ELECTRONIC STRUCTURE OF ENGINEERING SOLIDS. (3)**

Prerequisite: EN CH 350 or EN ME 350. Description of electronic behavior in engineering solids. Behavior of conductors, semiconductors and insulators in electrical fields. Thermal, magnetic and optical properties of engineering solids.

**EN ME 359. SPECIAL TOPICS IN STRUCTURE OF ENGINEERING MATERIALS. (3)**

Prerequisite: Consent of Instructor.

**EN ME 360. CHEMICAL PHYSICS OF ENGINEERING MATERIALS. (3)**

Prerequisite: EN CH 350 or EN ME 350. Thermodynamics and statistical mechanics of engineering solids. Cohesion, thermodynamic properties. Theory of solid solutions. Thermodynamics of mechanical, electrical, and magnetic phenomena in solids. Chemical thermodynamics, phase transitions and thermodynamic properties of polycrystalline and polyphase materials. Thermodynamics of defects in solids.

**EN ME 361. KINETICS OF REACTIONS IN MATERIALS. (3)**

Prerequisite: EN CH 360 or EN ME 360. The theory of thermally activated processes in solids as applied to diffusion, nucleation and interface motion. Cooperative and diffusionless transformations. Applications selected from processes such as allotropic transformations, precipitation, martensite formation, solidification, ordering, and corrosion.

**EN ME 369. SPECIAL TOPICS IN THE CHEMICAL PHYSICS OF MATERIALS. (3)**

Prerequisite: Consent of Instructor.

**EN ME 370. RHEOLOGY OF ENGINEERING MATERIALS. (3)**

Prerequisite: EN CH 350 or EN ME 350. Mechanical behavior with emphasis on the continuum point of view and its relationship to structural types. Elasticity, viscoelasticity, anelasticity and plasticity in single phase and multiphase materials.

## MECHANICAL ENGINEERING

### EN ME 371. DISLOCATIONS IN CRYSTALLINE MATERIALS. (3)

Prerequisite: EN CH 350 or EN ME 350. The nature and interactions of defects in crystalline solids, with primary emphasis on dislocations. The elastic and electric fields associated with dislocations. Effects of imperfections on mechanical and physical properties.

### EN ME 372. MECHANICAL PROPERTIES OF ENGINEERING MATERIALS. (3)

Prerequisite: EN CH 370 or EN ME 370. The mechanical properties of single crystals, polycrystalline and polyphase materials. Yield strength, work hardening, fracture, fatigue and creep are considered in terms of fundamental material properties.

### EN ME 379. SPECIAL TOPICS IN THE MECHANICAL BEHAVIOR OF ENGINEERING SOLIDS. (3)

Prerequisite: Consent of Instructor.

### EN ME 380. EXPERIMENTAL METHODS IN MATERIALS SCIENCE. (3)

Methods of measuring the structural aspects of materials. Optical and electron microscopy. Microscopic analytical techniques. Resonance methods. Electrical, optical and magnetic measurement techniques. Thermodynamic methods.

### EN ME 381. DIFFRACTION TECHNIQUES IN MATERIALS SCIENCE. (3)

Prerequisite: EN CH 350 or EN ME 350. Theory of diffraction of electrons, neutrons and x-rays. Strong emphasis on diffraction methods as applied to the study of defects in solids. Short range order, thermal vibrations, stacking faults, microstrain.

### EN ME 389. SPECIAL TOPICS IN EXPERIMENTAL TECHNIQUES IN MATERIALS SCIENCE. (3)

Prerequisite: Consent of Instructor.

### EN ME 390. POLYMERIC ENGINEERING MATERIALS. (3)

Prerequisite: EN CH 350 or EN ME 350 or consent of Instructor. A comprehensive summary of the fundamentals of particular interest in the science and applications of polymers. Polymer single crystals, transformation in polymers, fabrication of polymers as to shape and internal structure.

### EN ME 391. SPECIAL TOPICS IN MATERIALS TECHNOLOGY. (3)

Prerequisite: Consent of Instructor.

### EN ME 397. SEMINAR IN ENGINEERING MATERIALS. (1)

Discussion of current advances and research in engineering solids.

### EN ME 398. SPECIAL PROBLEMS IN ENGINEERING MATERIALS.

Special study or investigation in Materials Science under the direction of an assigned faculty advisor. Credit variable and since content changes, re-registration is permissible.

### EN ME 399. RESEARCH IN CHEMICAL ENGINEERING. RESEARCH IN NUCLEAR ENGINEERING. RESEARCH IN ENGINEERING MATERIALS.

Credit hours to be arranged. Laboratory fee, \$8.00 per semester (Research in Chemical Engineering). Laboratory fee, \$10.00 per semester (Research in Nuclear Engineering). The investigation of special problems and the preparation of a thesis in partial fulfillment of the requirements of an advanced degree. (Staff.)

# FIRE PROTECTION

*Professor:* BRYAN.

*Assistant Professor:* HICKEY.

## EN FP 104. ESSENTIALS OF FIRE PROTECTION. (3)

First semester. Two lectures and one laboratory period a week. Prerequisites, Math. 20, Physics 20 or Junior standing. An introductory course in fire protection. Chemistry of combustion and an analysis of the properties of matter affecting fire behavior. Detailed examination of the basic fire phenomenon.

## EN FP 105. FIRE PROTECTION ORGANIZATION. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisite, EN FP 104 or Junior standing. Fire loss records, and the economic aspects of fire protection. Organization and administration of municipal and industrial fire protection.

## EN FP 110. INSTALLATIONS AND EQUIPMENT. (4)

Second semester. Two lectures and one laboratory period a week. Prerequisite, EN FP 104. The design and installation of standard and special extinguishing systems. Standards of types, installation and maintenance of automatic sprinkler and fire alarm systems. The principles of fire extinguishment with laboratory tests.

## EN FP 111. SPECIAL HAZARDS AND PROBLEMS. (4)

First semester. Three lectures and one laboratory period a week. Prerequisite Senior standing. Special hazards in fire protection. A study of present and future problems, with the students selecting field or laboratory research problems.

## EN FP 112. FIRE PROTECTION FLUIDS AND SYSTEMS. (3)

First semester. Two lectures and one laboratory period a week. Prerequisite, EN CE 105. Fluids utilized in fire extinguishment operations, and fire protection systems. Laboratory and field study of operational and hydraulics problems.

## EN FP 114. FIRE ANALYSIS. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisite, EN FP 105 and Senior standing. The mass fire problem, with consideration of conflagrations and fire storms; thermal, structural, environmental, and meteorological factors; techniques of prediction and fuel analysis.

## EN FP 117. TECHNICAL PROJECTS. (4)

Second semester. Three lectures and one laboratory period a week. Prerequisite, EN FP 111, and Senior standing. An examination of the specialized areas of fire protection and the development of problems in these areas. Student development and discussion of research projects in specialized areas of fire protection.

## EN FP 120. INSURANCE RATING AND SCHEDULES. (3)

First semester. Two lectures and one laboratory period a week. Prerequisite, Math. 21, Physics 21 or Junior standing. A study of the insurance grading and rating schedules and their principles of application. The examination of specific laws, codes and ordinances. Laboratory practice in the preparation of reports and diagrams.

# The Faculty

## COLLEGE OF ENGINEERING GLENN L. MARTIN INSTITUTE OF TECHNOLOGY

BECKMANN, ROBERT BADER, Dean  
WOCKENFUSS, WILLIAM ARTHUR, Assistant to the Dean

### *Department Heads*

MARCHELLO, Joseph M., Acting Head of Department of Chemical Engineering  
BRYAN, John Leland, Head, Fire Protection Curriculum  
BYRUS, Robert Charles, Director, Fire Service Extension  
GROSS, Donald Shaeffer, Director, Wind Tunnel Operations  
LEE, William M., Librarian, Engineering and Physical Sciences  
LOONEY, Charles Thomas George, Head, Department of Civil Engineering  
MARTIN, Monroe Harnish, Director, Institute for Fluid Dynamics and Applied Mathematics  
SHERWOOD, Aaron Wiley, Head, Department of Aerospace Engineering.  
SHREEVE, Charles Alfred, Jr., Head, Department of Mechanical Engineering  
TOMPKINS, Howard Edward, Head, Department of Electrical Engineering

### *Staff in Residence*

ALLEN, Redfield Wilmerton, Professor of Mechanical Engineering  
B.S., University of Maryland, 1943; M.S., 1949; Ph.D., University of Minnesota, 1959.  
ALLEN, Russell Bennett, Professor Emeritus of the College of Engineering and Professor of Civil Engineering  
B.S., Yale University, 1923; Registered Professional Engineer.  
ANAND, Davinder K., Assistant Professor of Mechanical Engineering  
B.S., George Washington University, 1950; M.S., 1961; Ph.D., 1965.  
ASIMOW, Robert M., Associate Professor of Mechanical Engineering  
B.S., University of California, 1953; Ph.D., 1958.  
BACHTLER, Joseph deRolle, Senior Instructor, Fire Service Extension  
B.S., University of Southern California, 1956.  
BASHAM, Ray Scott, Associate Professor of Electrical Engineering  
B.S., U.S. Military Academy, 1945; M.S., University of Illinois, 1952; Ph.D., 1962.

## FACULTY

- BECKER, Roger D.**, Instructor in Mechanical Engineering  
B.M.E., Rensselaer Polytechnic Institute, 1957.
- BECKMANN, Robert Bader**, Dean of the College of Engineering and Professor of Chemical Engineering  
B.S., in Ch.E., University of Illinois, 1940; Ph.D., University of Wisconsin, 1944.
- BERGER, Bruce S.**, Associate Professor of Mechanical Engineering  
B.S., University of Pennsylvania, 1954; M.S., 1959; Ph.D., 1962.
- BOWERS, Allen Atwill**, Project Engineer, Wind Tunnel Operations  
B.S., University of Maryland, 1952.
- BRAMBLE, James H.**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics  
A.B., Brown University, 1953; M.A., University of Maryland, 1955; Ph.D., 1958.
- BROWNE, Vance D.**, Instructor in Mechanical Engineering  
B.S., University of Maryland, 1964.
- BRYAN, John Leland**, Professor and Head, Fire Protection Curriculum  
B.S., Oklahoma State University, 1953; M.S., 1954; Ed.D., American University, 1965.
- BUCKLEY, Frank T., Jr.**, Instructor in Mechanical Engineering  
B.S.A.E., University of Maryland, 1959.
- BURGERS, Johannes Martinus**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics  
Doctor of Mathematics and Physics, University of Leiden, 1918; Doctor Honoris Causa, University Libre de Bruxelles, 1948; Doctor Honoris Causa, University of Poitiers (France), 1950.
- BYRUS, Robert Charles**, Director, Fire Service Extension
- CADMAN, Wesley Theodore**, Assistant Professor of Chemical Engineering  
B.S., Carnegie Institute of Technology, 1962; M.S., 1964; Ph.D., 1965.
- CHARATIS, George**, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics  
B.S., University of Michigan, 1947; M.S., 1949; Ph.D., 1962.
- CHU, Yaohan**, Professor of Electrical Engineering and Computer Science  
B.S. (M.E.), Chiao-Tung University (Shanghai, China), 1942; M.S. (M.E.), Massachusetts Institute of Technology, 1945; Sc.D. (Instr. & Control), 1953.
- COLBURN, Theodore R.**, Instructor in Electrical Engineering  
B.S., University of Maryland, 1962; M.S., University of Maryland, 1966.
- COOKSON, John T., Jr.**, Assistant Professor of Civil Engineering  
B.S., Washington University, 1961; M.S., 1962; Ph.D., California Institute of Technology, 1965.

## FACULTY

CORNING, Gerald, Professor of Aerospace Engineering

B.S., New York University, 1937; M.S., The Catholic University of America, 1954.

COURNIN, John Burton, Associate Professor of Civil Engineering

B.S., A.E., University of Alabama, 1946; M.S.C.E., 1948; Registered Professional Engineer.

CUNIFF, Patrick F., Associate Professor of Mechanical Engineering

B.S., Manhattan College, 1955; M.S., Virginia Polytechnic Institute, 1956; Ph.D., 1962.

DEVORE, Howard, Instructor in Mechanical Engineering

B.M.E., Ohio State University, 1962; M.S., 1962.

DIAZ, Joaquin Basilio, Research Professor, Institute for Fluid Dynamics and Applied Mathematics

B.A., University of Texas, 1940; Ph.D., Brown University, 1945.

DORFMAN, J. Robert, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics

A.B., The Johns Hopkins University, 1957; Ph.D., 1961.

DUFFEY, Dick, Professor of Chemical Engineering.

B.S., Purdue University, 1939; M.S., University of Iowa, 1940; Ph.D., University of Maryland, 1956; Registered Professional Engineer.

ELKINS, Richard L., Assistant Professor of Mechanical Engineering

B.S., University of Maryland, 1953; M.A., 1958.

EYLER, Addison Bernard, Associate Professor of Mechanical Engineering

B.S., University of Maryland, 1947; M.S., 1950.

FALLER, Alan Judson, Research Professor, Institute for Fluid Dynamics and Applied Mathematics and Lecturer in Aerospace Engineering

B.S., Massachusetts Institute of Technology, 1951; M.S., 1953; Sc.D., 1957.

FERRIS, Clifford Duras, Associate Professor of Electrical Engineering.

B.S.E.E., University of Pennsylvania, 1957; M.S., 1958; D.Sc., George Washington University, 1962.

FICHERA, Gaetano, Visiting Research Professor, Institute for Fluid Dynamics and Applied Mathematics

Laurea, Universita di Roma, 1941.

FIROUZABADI, Ahmad Haji, Instructor in Electrical Engineering

B.S., (Physics), University of Tehran (Iran), 1954; M.S., University of Maryland, 1960.

FISHER, Franklin E., Instructor in Mechanical Engineering

B.S., Rose Polytechnic Institute, 1960; M.S., University of Maryland, 1965.

FRIEDMAN, Gerald Edward, Instructor in Electrical Engineering

B.S., University of Maryland, 1956; M.S., 1962.

- GARBER, Daniel Leedy, Jr., Assistant Professor of Civil Engineering  
B.S., University of Maryland, 1952; M.S., 1959; Ph.D., 1964.
- GINNINGS, Robert Meade, Assistant Professor of Electrical Engineering.  
B.S., University of Maryland, 1958; M.S., 1960; Ph.D., 1965.
- GLASS, Robert J., Instructor in Mechanical Engineering  
B.S., Yale University, 1952.
- GLOCK, Russell, Jr., Instructor in Electrical Engineering  
B.S., University of Maryland, 1959.
- GLOMB, John W., Assistant Professor of Chemical Engineering  
B.S., Lehigh University, 1957; M.S., 1961; Ph.D., 1966.
- GOHR, Carl William, Associate Professor of Civil Engineering  
B.S., Michigan State University, 1926; Registered Professional Engineer.
- GOMEZPLATA, Albert, Associate Professor of Chemical Engineering  
B.Ch.E., Brooklyn Polytechnic Institute, 1952; M.Ch.E., Rensselaer Polytechnic Institute, 1954; Ph.D., 1958.
- GROSS, Donald Shaeffer, Director, Wind Tunnel Operations  
B.S., University of Maryland, 1947.
- GUERNSEY, Ralph Lewis, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics  
B.A., Miami University, 1952; M.S., 1954; Ph.D., 1960.
- GUHA, Arun Kanti, Instructor in Electrical Engineering  
B.Sc., Presidency College, Calcutta (India), 1953; M.Sc., University College of Technology, Calcutta (India), 1956; M.S., University of Wisconsin, 1959.
- HAHN, William Robert, Jr., Instructor in Electrical Engineering  
B.S.E.E., George Washington University, 1958.
- HASPERT, J. Kent, Instructor in Mechanical Engineering  
B.S., University of Maryland, 1965.
- HAYLECK, Charles Raymond, Jr., Associate Professor of Mechanical Engineering  
B.S., University of Maryland, 1943; M.S., 1949.
- HEINS, Conrad P., Jr., Instructor in Civil Engineering  
B.S., Drexel Institute of Technology, 1960; M.S., Lehigh University, 1962.
- HICKEY, Harry Elmer, Assistant Professor of Fire Protection  
B.S., State University of New York, 1955; M.S., 1959.
- HOCHULI, Urs Erwin, Associate Professor of Electrical Engineering  
Dipl. Elektro-Techniker, Technikum Biel (Switzerland), 1950; M.S., University of Maryland, 1955; Ph.D. (Physics), Catholic University, 1962.
- HOGLUND, John William, Senior Instructor, Fire Service Extension
- HUBBARD, Bertie E., Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics  
B.S., Western Illinois University, 1949; M.S., State University of Iowa, 1952; Ph.D., University of Maryland, 1960.

## **FACULTY**

**JACKSON, John W., Professor of Mechanical Engineering**

B.S., University of Cincinnati, 1934; M.E., 1937; M.S., California Institute of Technology, 1940; Registered Professional Engineer.

**JOHN, James E. A., Associate Professor of Mechanical Engineering**

B.S.E., Princeton University, 1955; M.S.E., 1957; Ph.D., University of Maryland, 1963.

**JONES, Grover S., Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics**

A.B., Duke University, 1952; M.S., University of North Carolina, 1958; Ph.D., University of Cincinnati, 1960.

**KELMAN, Robert B., Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics**

A.B., University of California, 1953; M.A., 1955; Ph.D., 1958.

**KIM, Hogil, Assistant Professor of Electrical Engineering and Physics**

B.S. (Physics), Seoul National University (Korea), 1956; Ph.D. (Physics), University of Birmingham (England), 1964.

**KISIELEWSKI, Richard W., Instructor in Mechanical Engineering**

B.S., University of Maryland, 1963.

**KOOPMAN, David Warren, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics**

B.A., Amherst College, 1957; M.S., University of Michigan, 1959; Ph.D., 1964.

**KRAFT, James H., Instructor in Mechanical Engineering**

B.M.E., Georgia Institute of Technology, 1959; M.S., Rensselaer Polytechnic Institute, 1961.

**LANDSBERG, Helmut, Visiting Research Professor (P. T.), Institute for Fluid Dynamics and Applied Mathematics**

Ph.D., University of Frankfurt, 1930.

**LARSON, Jerome Valjean, Instructor in Electrical Engineering**

B.S., University of Maryland, 1960; M.S., 1963.

**LASHINSKY, Herbert, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics**

B.S., College of the City of New York, 1950; Ph.D., Columbia University, 1961.

**LEPPER, Henry Albert, Jr., Professor of Civil Engineering**

B.S. in C.E., The George Washington University, 1936; M.S., University of Illinois, 1938; D.Eng., Yale University, 1947; Registered Professional Engineer.

**LOONEY, Charles Thomas George, Professor of Civil Engineering and Head of the Department**

B.S., Carnegie Institute of Technology, 1932; M.S., in C.E., University of Illinois, 1934; Ph.D., 1940; Registered Professional Engineer.

**LUBARD, Stephen Charles, Instructor in Aerospace Engineering**

B.Sc., Polytechnic Institute of Brooklyn, 1964; M.S., New York University, 1965.

## FACULTY

**MACKIE, A. G.**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics

M.A., University of Edinburgh, 1948; B.A., 1952; Ph.D., University of St. Andrews, 1953.

**MARCHELLO, Joseph M.**, Associate Professor of Chemical Engineering

B.S., in Ch.E., University of Illinois, 1955; Ph.D., Carnegie Institute of Technology, 1959.

**MARCOVITZ, Alan Bernard**, Assistant Professor of Electrical Engineering

S.B., Massachusetts Institute of Technology, 1959; S.M., 1959; Ph.D., Columbia University, 1963.

**MARKS, Colin H.**, Assistant Professor of Mechanical Engineering

B.S., in M.E., Carnegie Institute of Technology, 1956; M.S., in M.E., 1957; Ph.D., University of Maryland, 1965.

**MARTIN, Monroe Harnish**, Professor of Mathematics and Director of the Institute for Fluid Dynamics and Applied Mathematics

B.S., Lebanon Valley College, 1928; Ph.D., The Johns Hopkins University, 1932; D.Sc., Lebanon Valley College, 1958.

**MARTIN, Richard Lawrence**, Instructor in Electrical Engineering

B.S., University of Maryland, 1959; M.S., 1962.

**MATTHEWS, David L.**, Visiting Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics

B.S., Queen's University (Canada), 1949; Ph.D., Princeton University, 1959.

**MAVIS, Frederic T.**, Professor of Mechanical Engineering

B.S., University of Illinois, 1922; M.S., 1926; Ph.D., 1935.

**MC AULIFFE, Kenneth J., Jr.**, Instructor in Mechanical Engineering

B.S., in M.E., University of Maryland, 1960.

**MCDONAGH, Joseph Martin**, Senior Instructor, Fire Service Extension

B.S., University of Maryland, 1961.

**MELNIK, Walter L.**, Associate Professor of Aerospace Engineering

B.S., University of Minnesota, 1951; M.S., 1953; Ph.D., 1964.

**MERCIER, Jacques L.**, Assistant Professor of Civil Engineering

Ing. Dipl., Ecole Polytechnique Federale, 1958; Ph.D., University of Washington, 1965.

**METCALF, Frederic T.**, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics

B.A., Lake Forest College, 1957; M.A., University of Maryland, 1959; Ph.D., 1961.

**MILLER, Edward Francis, Jr.**, Instructor in Electrical Engineering

B.S., Iowa State University, 1962; M.S. (Applied Math), University of Colorado, 1964.

**MOLDAVSKY, Michael**, Instructor in Electrical Engineering.

B.S., Purdue University, 1961; M.S., University of Illinois, 1963.

## FACULTY

**MONTEROLL, Elliott W.**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics

B.S., University of Pittsburgh, 1937; Ph.D., 1940.

**MORIN, Donald G.**, Instructor in Mechanical Engineering

B. Aero. Eng. Polytechnic Institute of Brooklyn, 1957.

**MUNNO, Frank J.**, Assistant Professor of Chemical Engineering

B.S., Waynesburg College, 1957; M.S., University of Florida, 1962; Ph.D., 1964.

**NESS, Norman F.**, Visiting Research Associate Professor (P. T.), Institute for Fluid Dynamics and Applied Mathematics

B.S., Massachusetts Institute of Technology, 1955; Ph.D., 1959.

**NORTH, Richard C.**, Instructor in Mechanical Engineering

B.M.E., Pratt Institute, 1958; M.S., Stevens Institute, 1963.

**ORTEGA, James M.**, Senior Research Analyst, Computer Science Center and Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics

B.S., University of New Mexico, 1954; Ph.D., Stanford University, 1962.

**OTTS, Louis Ethelbert, Jr.**, Professor of Civil Engineering

B.A., East Texas Teachers College, 1933; B.S., Agricultural and Mechanical College of Texas, 1946; M.S., 1946; Registered Professional Engineer.

**OWENS, William R.**, Instructor in Mechanical Engineering

B.S., Pennsylvania State University, 1959; M.S., Drexel Institute of Technology, 1964.

**PAI, Shih-I.**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics and Lecturer in Aerospace Engineering

B.S., National Central University (China), 1935; M.S., Massachusetts Institute of Technology, 1938; Ph.D., California Institute of Technology, 1940.

**PIPER, Harry William**, Associate Professor of Civil Engineering

B.Arch.E., Catholic University of America, 1940; M.C.E., 1961; Registered Professional Engineer.

**POTTALA, Erik William**, Instructor in Electrical Engineering

B.S., Worcester Polytechnic Institute, 1961; M.Eng., Yale University, 1963.

**PRICE, Henry Williams, Jr.**, Associate Professor of Electrical Engineering

B.S., University of Maryland, 1943; M.S., 1950.

**PUCKETT, Paul B.**, Instructor in Mechanical Engineering

B.S., U. S. Naval Academy, 1945; M.S., University of Oklahoma, 1959.

**PUGSLEY, James Harwood**, Assistant Professor of Electrical Engineering

A.B. (Physics), Oberlin College, 1956; M.S., University of Illinois, 1958; Ph.D., 1963.

**REDDY, Kapuluru C.**, Instructor in Aerospace Engineering

B.A., V. R. College, Mellore, India, 1959; M.Sc., S. V. University, Tirupati, India, 1961; M.Tech., Indian Institute of Technology, 1962.

- REED, Henry Rouse**, Professor of Electrical Engineering  
B.S., University of Minnesota, 1925; M.S., 1927; Ph.D., The State University of Iowa, 1941; Registered Professional Engineer.
- REILLY, Richard Selmer**, Instructor in Aerospace Engineering  
B.S., University of Maryland, 1961.
- REILLY, Robert J.**, Instructor in Civil Engineering  
B.S., Manhattan College (N.Y.), 1960; M.S., University of Maryland, 1962.
- REISER, Martin Paul**, Associate Professor of Electrical Engineering and Physics  
Diploma, Johannes Gutenberg Universitat Mainz (Germany), 1957; Ph.D. (Physics), 1960.
- RHEINBOLDT, Werner Carl**, Research Professor, Computer Science Center and Research Professor, Institute for Fluid Dynamics and Applied Mathematics  
Dipl. Math., University of Heidelberg, 1952; Dr.Rer.Nat., University of Freiburg, 1955.
- RIVELLO, Robert Matthew**, Associate Professor of Aerospace Engineering  
B.S., University of Maryland, 1943; M.S., 1948; Registered Professional Engineer.
- RUMBAUGH, Jeffrey Hamilton**, Instructor in Electrical Engineering  
B.S., University of Maryland, 1957.
- RUTELLI, Giovanni Pietro**, Associate Professor of Electrical Engineering  
Ph.D. (Physics), University of Palermo (Italy), 1923; Ph.D. (E.E.), Polytechnic Institute of Turin (Italy), 1928; Libera Docenza, Rome, 1947.
- SAYRE, Clifford L., Jr.**, Professor of Mechanical Engineering  
B.S., Duke University, 1947; M.S., Stevens Institute of Technology, 1950; Ph.D., University of Maryland, 1961; Registered Professional Engineer
- SCHELLING, David R.**, Instructor in Civil Engineering  
B.S., Lehigh University, 1961; M.S., Drexel Institute of Technology, 1964.
- SCHETZ, Joseph A.**, Associate Professor of Aerospace Engineering  
B.S., Webb Institute of Naval Architecture, 1958; M.S., Princeton University, 1960; M.A., Princeton University, 1961; Ph.D., Princeton University, 1962.
- SCHROEDER, Wilburn Carroll**, Professor of Chemical Engineering  
B.S., University of Michigan, 1930; M.S., 1931; Ph.D., 1933; Registered Professional Engineer.
- SEIDEL, Carl L., C. D. Specialist**, Fire Service Extension  
B.S., University of Maryland, 1963.
- SEKSCIENSKI, William Stanley**, Project Engineer, Wind Tunnel Operations  
B.S., University of Maryland, 1955.
- SHERWOOD, Aaron Wiley**, Professor of Aerospace Engineering and Head of the Department  
M.E., Rensselaer Polytechnic Institute, 1935; M.S., University of Maryland, 1943; Registered Professional Engineer.

## FACULTY

- SHREEVE, Charles Alfred, Jr.**, Professor of Mechanical Engineering and Head of the Department  
B.E., The Johns Hopkins University, 1935; M.S., University of Maryland, 1943; Registered Professional Engineer.
- SILVERMAN, Joseph**, Professor of Chemical Engineering  
B.A., Brooklyn College, 1944; A.M., Columbia University, 1948; Ph.D., 1951.
- SIMONS, David Elie**, Associate Professor of Electrical Engineering  
B.S., University of Maryland, 1949; M.S., 1951.
- SKOLNICK, Leonard Philip**, Associate Professor of Chemical Engineering  
B.S., University of Rochester, 1953; A.B., 1953; M.S., New York University, 1955; Sc.D., M.I.T., 1958.
- SMITH, Robert B.**, Senior Instructor, Fire Service Extension  
B.A., College of William and Mary, 1953.
- SMITH, Theodore G.**, Assistant Professor of Chemical Engineering  
B.E.S., Johns Hopkins, 1956; M.S., 1958; Ph.D., Washington University, 1960.
- TALAAT, Mostafa E.**, Professor of Mechanical Engineering  
B.S.C., University of Cairo, 1946; M.S., University of Pennsylvania, 1947; Ph.D., 1951.
- TIDMAN, Derek A.**, Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics  
B.Sc., Imperial College of Science, (London), 1952; D.I.C., 1953; Ph.D., 1955.
- TOMPKINS, Howard Edward**, Professor of Electrical Engineering and Head of the Department  
B.A. (Physics), Swarthmore College, 1942; M.S. (Physics), University of Pennsylvania, 1947; Ph.D., 1957.
- TRYTTEN, George N.**, Research Assistant Professor, Institute for Fluid Dynamics and Applied Mathematics  
A.B., Luther College, 1951; M.S., University of Wisconsin, 1953; Ph.D., University of Maryland, 1962.
- WAGNER, Thomas Charles Gordon**, Professor of Electrical Engineering  
B.S. (Math.), Harvard College, 1937; M.A. (Math.), University of Maryland, 1940; Ph.D. (Math.), 1943.
- WALSTON, William H., Jr.**, Assistant Professor of Mechanical Engineering  
B.M.E., University of Delaware, 1959; M.S., 1961, Ph.D., 1964.
- WEDDING, Presley Allen**, Associate Professor of Civil Engineering  
B.S., University of Maryland, 1937; M.S., 1952; Registered Professional Engineer.
- WEINSTEIN, Alexander**, Research Professor, Institute for Fluid Dynamics and Applied Mathematics  
Ph.D., Zurich, 1921; Docteur es Sciences, University of Paris, France, 1937.
- WERNETH, Russell L.**, Instructor in Mechanical Engineering  
B.S., University of Maryland, 1964.

WESKE, John Robert, Professor of Aerospace Engineering

Dipl. Ing., Hannover Institute of Technology, 1924; M.S., Harvard University, 1931; Sc.D., 1934; Registered Professional Engineer.

WILKERSON, Thomas D., Research Associate Professor, Institute for Fluid Dynamics and Applied Mathematics

B.S., University of Michigan, 1953; M.S., 1954; Ph.D., 1962.

WINDSOR, Richard Isaac, Assistant Director, Wind Tunnel Operations

B.S., University of Maryland, 1950; M.S., 1960.

WOCKENFUSS, William Arthur, Associate Professor of Mechanical Engineering and Assistant to the Dean

B.S., University of Maryland, 1949; M.Ed., 1952; Ed.D., University of Florida, 1960.

YANG, Jackson, Assistant Professor of Mechanical Engineering

B.S., University of Maryland, 1958; M.S., 1962; Ph.D., 1963.

### *Lecturers and Educational Advisers*

ASKEW, Warren S., Lecturer in Chemical Engineering

B.S., Carnegie Institute of Technology, 1962; Ph.D., University of Maryland, 1965.

BILLIG, Frederick S., Lecturer in Aerospace Engineering

B.S., Johns Hopkins University, 1955; M.S., University of Maryland, 1958; Ph.D., University of Maryland, 1964.

BLOEM, Delmar L., Lecturer in Civil Engineering

B.S., Iowa State College, 1943; Registered Professional Engineer

BULLIS, William Murray, Lecturer in Electrical Engineering

B.A. (Physics), Miami University (Ohio), 1951; Ph.D. (Physics), Massachusetts Institute of Technology, 1956.

COHEN, Andrew R., Lecturer in Electrical Engineering

B.S., Massachusetts Institute of Technology, 1957; M.S., 1958; Ph.D., Purdue University, 1961.

DAWSON, Victor C.D., Lecturer in Mechanical Engineering

B.S., Massachusetts Institute of Technology, 1948; M.S., Harvard University, 1951; M.E., California Institute of Technology, 1959; Ph.D., University of Maryland, 1963; Registered Professional Engineer.

DEGENFORD, James Edward, Lecturer in Electrical Engineering

B.S., University of Illinois, 1960; M.S., 1961; Ph.D., 1964.

GOLDMAN, David Tobias, Lecturer in Chemical Engineering

B.S., Brooklyn College, 1952; M.S., Vanderbilt, 1954; Ph.D., University of Maryland, 1958.

GOLDSTEIN, Irwin Joseph, Lecturer in Chemical Engineering

B.S., Metallurgy, Massachusetts Institute of Technology, 1960; M.S., 1962; Sc.D., 1964.

## FACULTY

- HABERMAN, William L.**, Lecturer in Mechanical Engineering  
B.M.E., Cooper Union, 1949; M.S., University of Maryland, 1952; Ph.D., 1956.
- JONES, Harold Chester**, Lecturer in Electrical Engineering  
B.S., Illinois Institute of Technology, 1949; M.S., University of Maryland, 1961.
- LIN, Hung Chang**, Lecturer in Electrical Engineering  
B.S.E.E., Chiaotung University (China), 1941; M.S.E., University of Michigan, 1948; D.E.E., Polytechnic Institute of Brooklyn, 1956.
- MASTASCUSA, Edward John**, Lecturer in Electrical Engineering  
B.S.E.E., Carnegie Institute of Technology, 1960; M.S., 1961; Ph.D., 1964.
- MEYERSON, Melvin R.**, Lecturer in Mechanical Engineering  
B.S., Virginia Polytechnic Institute, 1942; M.S., University of Maryland, 1953; Ph.D., 1962.
- MUNSON, John Christian**, Lecturer in Electrical Engineering  
B.S., Iowa State College, 1949; M.S., University of Maryland, 1952; Ph.D., 1962.
- OHMAN, Gunnar Peter**, Lecturer and Adviser in Electrical Engineering  
B.S.E.E., Illinois Institute of Technology, 1943; M.S., University of Maryland, 1948; Ph.D., 1959.
- PARKER, Carlyle V.**, Lecturer in Electrical Engineering  
B.S.E. (E. E.) and B.S.E. (Physics), University of Michigan, 1936.
- ROBERTS, Richard Calvin**, Lecturer in Civil Engineering  
A.B., Kenyon College, 1946; Sc.M., Brown University, 1946; Ph.D., 1949.
- SCHUCHARD, Earl Adolph**, Lecturer and Adviser in Electrical Engineering  
B.S. (Physics), University of Washington, 1933; M.S. (Physics), 1934; Ph.D. (Physics), 1940.
- SCHULMAN, Joseph Robert**, Lecturer in Electrical Engineering  
B.E.E., City College of New York, 1944; M.S., University of Maryland, 1951.
- SEIGEL, Arnold E.**, Lecturer in Aerospace and Mechanical Engineering  
B.S., University of Maryland, 1944; M.S., Massachusetts Institute of Technology, 1947; Ph.D., University of Amsterdam (Holland), 1952.
- WALKER, Stanton**, Lecturer in Civil Engineering  
B.S., University of Illinois, 1917; Registered Professional Engineer. Honorary Doctorate Degree, University of Maryland, 1962.
- WHICKER, Lawrence Rhea**, Lecturer in Electrical Engineering  
B.S., University of Tennessee, 1957; M.S., 1958; Ph.D., Purdue University, 1964.
- WILSON, Robert Elmer**, Lecturer in Aerospace Engineering  
B.S., Georgia Institute of Technology, 1941; M.S., 1942; Ph.D., University of Texas, 1952.





*CATALOG OF THE*  
COLLEGE  
OF  
HOME  
ECONOMICS  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*January 20, 1966*

*No. 15*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Re-entered at the Post Office at College Park, Maryland, as second class mail matter under the Act of Congress on August 24, 1912. Published twenty-nine times.



# CONTENTS

## GENERAL

University Calendar . . . . .	iv	Academic Information . . . . .	3
Board of Regents . . . . .	vi	Admission . . . . .	3
Officers of the University . . . . .	vii	Costs . . . . .	4
Chairmen, Standing Committee, Faculty Senate . . . . .	xi	Degrees . . . . .	4
The College . . . . .	1	Air Science Instruction . . . . .	4
Special Facilities and Activities . . . . .	1	The Student Load . . . . .	4
Honors and Awards, Scholarships and Loan Fund . . . . .	2	Curricula . . . . .	5
		America Studies Program . . . . .	5
		General Information . . . . .	5

## CURRICULA AND REQUIRED COURSES

Home Economics in Technical Areas . . . . .	9	Family Life or General (Foundation) Home Economics . . . . .	16
Food, Nutrition, and Institution Administration . . . . .	9	Home Economics Education . . . . .	17
Textiles and Clothing . . . . .	12	Home Economics in Related Art Areas . . . . .	19
Home Economics in Educational, Community, and Family Life Areas . . . . .	14	Housing and Applied (Art) Design . . . . .	19
Extension Home Economics . . . . .	15	Crafts . . . . .	21

## COURSE OFFERINGS

Food, Nutrition, and Institution Administration . . . . .	23	General (Foundation) Home Economics . . . . .	32
Textiles and Clothing . . . . .	28	Family Life and Management . . . . .	33
Home Economics Education . . . . .	31	Housing and Applied (Art) Design . . . . .	35
Faculty . . . . .			41

# University Calendar, 1965-66

(TENTATIVE)

## *FALL SEMESTER, 1965*

### SEPTEMBER

- 13-17 Monday through Friday—Fall Semester Registration
- 20 Monday—Instruction begins

### NOVEMBER

- 24 Wednesday, after last class—Thanksgiving recess begins
- 29 Monday, 8:00 A.M.—Thanksgiving recess ends

### DECEMBER

- 22 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Monday, 8:00 A.M.—Christmas recess ends
- 17 Monday—Pre-exam Study Day
- 18-24 Tuesday-Monday—Fall Semester Examinations

## *SPRING SEMESTER, 1966*

### JANUARY-FEBRUARY

- 31-4 Monday through Friday—Spring Semester Registration
- 7 Monday—Instruction begins
- 22 Tuesday—Washington's Birthday, holiday

### MARCH

- 25 Friday—Maryland Day, not a holiday

### APRIL

- 7 Thursday, after last class—Easter recess begins
- 12 Tuesday, 8:00 A.M.—Easter recess ends

### MAY

- 11 Wednesday—AFROTC Day
- 25 Wednesday—Pre-exam Study Day
- 26-June 3 Thursday through Friday—Spring Semester Examinations
- 29 Sunday—Baccalaureate Exercises
- 30 Monday—Memorial Day, holiday

### JUNE

- 4 Saturday—Commencement Exercises

## *SUMMER SESSION, 1966*

### JUNE

- 20-21 Monday, Tuesday—Registration, Summer Session
- 22 Wednesday—Instruction begins
- 25 Saturday—Classes (Monday schedule)

### JULY

- 4 Monday—Independence Day, holiday
- 9 Saturday—Classes (Tuesday schedule)

### AUGUST

- 12 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1966*

### JUNE

- 13-17 Monday through Friday—Rural Women's Short Course

### AUGUST

- 1-5 Monday through Friday—4-H Club Week

### SEPTEMBER

- 6-9 Tuesday through Friday—Fireman's Short Course

# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

- 12-16 Monday-Friday—Fall Semester Registration
- 19 Monday—Instruction begins

### NOVEMBER

- 23 Wednesday, after last class—Thanksgiving recess begins
- 28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

- 21 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Tuesday, 8:00 A. M.—Christmas recess ends
- 18 Wednesday—Pre-exam Study Day
- 19-25 Thursday-Wednesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

- 31-Feb. 3 Tuesday-Friday—Spring Semester Registration

### FEBRUARY

- 6 Monday—Instruction begins
- 22 Wednesday—Washington's Birthday, holiday

### MARCH

- 23 Thursday, after last class—Easter recess begins
- 28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

- 10 Wednesday—AFROTC Day
- 24 Wednesday—Pre-exam Study Day
- 25-June 2 Thursday-Friday—Spring Semester Examinations
- 28 Sunday—Baccalaureate Exercises
- 30 Tuesday—Memorial Day, holiday

### JUNE

- 3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

- 19-20 Monday-Tuesday—Registration, Summer Session
- 21 Wednesday—Instruction begins
- 24 Saturday—Classes (Monday schedule)

### JULY

- 4 Tuesday—Independence Day, holiday
- 8 Saturday—Classes (Tuesday schedule)

### AUGUST

- 11 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

- 12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

- 7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

- 5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

MRS. JOHN L. WHITEHURST

*4101 Greenway, Baltimore, 21218*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT. BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### ASSISTANT TO THE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr.—*A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### ASSISTANT TO THE VICE PRESIDENT FOR ACADEMIC AFFAIRS

Leslie R. Bundgaard—*B.S., University of Wisconsin, 1948; M.S., 1949; Ph.D., Georgetown University, 1954.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schutz—*B.S., University of Maryland, 1938; M.S., 1940.*

#### DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

#### DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

#### ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

#### DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

#### ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

### *Emeriti*

#### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

#### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

#### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

### *Deans of the Schools and Colleges*

#### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

#### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

#### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

#### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

#### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

#### ACTING DEAN OF THE COLLEGE OF ENGINEERING

Russell B. Allen—*B.S., Yale University, 1923; Registered Professional Engineer.*

DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY  
Homer W. Schamp, Jr.—*A.B.*, *Miami University*, 1944; *M.Sc.*, *University of Michigan*, 1947; *Ph.D.*, 1952.

#### DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S.*, *University of Connecticut*, 1924; *M.S.*, *University of Vermont*, 1926; *Ph.D.*, *Columbia University*, 1931.

#### ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna R. Chapman—*B.S.*, *University of Maryland*, 1934; *M.S.*, 1939.

#### DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B.*, *Harvard College*, 1944; *LL.B.*, *Harvard Law School*, 1948.

#### DEAN OF THE SCHOOL OF LIBRARY SCIENCE

Paul Wasserman—*B.B.A.*, *College of the City of New York*, 1948; *M.S. (L.S.)*, *Columbia University*, 1949; *M.S. (Economics)* *Columbia University*, 1950; *Ph.D.*, *University of Michigan*, 1960.

#### DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S.*, *University of Idaho*, 1924; *M.S.*, 1925; *M.D.*, *University of Louisville*, 1929; *Ph.D.*, (*Hon.*), *University of Louisville*, 1946.

#### DEAN OF THE SCHOOL OF NURSING

Florence M. Gipe—*B.S.*, *Catholic University of America*, 1937; *M.S.*, *University of Pennsylvania*, 1940; *Ed.D.*, *University of Maryland*, 1952.

#### DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C.*, *South Dakota State College*, 1929; *B.S.*, 1929; *M.S.*, *University of Maryland*, 1932; *Ph.D.*, 1933.

#### DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A.*, *Randolph-Macon College*, 1928; *M.A.*, 1937; *Ph.D.*, *Peabody College*, 1939.

#### DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B.*, *Huron College*, 1933; *M.A.*, *University of Chicago*, 1939; *D.S.W.*, *Western Reserve University*, 1954.

#### DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A.*, *Wabash College*, 1929; *M.A.*, *Butler University*, 1930; *Ph.D.*, *Syracuse University*, 1937.

### *Directors of Educational Services and Programs*

#### ACTING DEAN FOR STUDENT LIFE

Francis A. Gray—*B.S.*, *University of Maryland*, 1943.

#### DEAN OF WOMEN

Helen E. Clarke—*B.S.*, *University of Michigan*, 1943; *M.A.*, *University of Illinois*, 1951; *Ed.D.*, *Teachers College, Columbia University*, 1960.

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### ACTING DIRECTOR, COMPUTER SCIENCE CENTER

John P. Menard—*B.A., San Michael's College, 1954*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS, AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

THE COLLEGE OF HOME ECONOMICS SERVES MARYLAND AND SURROUNDING areas with its program for the education of young men and women interested in the social, economic, scientific and aesthetic aspects of homemaking and of family living in relation to the community. The educational offerings of the College are planned to help students function effectively and creatively as individuals, as family members and as responsible citizens; to prepare them for positions for which home economics is a major or minor preparation; and to promote an appreciation for and utilization of the findings of research. The College is concerned with contributing to the education for home and family life of women and men enrolled in other schools and colleges as well as those majoring in home economics.

The over-all function of home economics is to integrate the contributions of the physical and biological sciences, the social sciences, psychology, philosophy and art in the treatment of all phases of home and family life, to the end that they are used by families in all parts of society and by the agencies serving families.

The College of Home Economics is organized into the Departments of Food, Nutrition, and Institution Administration; Family Life and Management; Housing and Applied Design; and Textiles and Clothing. The curricula offered are: General (foundation) home economics; applied design (crafts, advertising, costume, and interiors); food, nutrition, and related science; home economics education; home economics extension; family life and management; institution administration; textiles and clothing; and textiles and related science.

## *Special Facilities and Activities*

### PHYSICAL FACILITIES

The home of the College of Home Economics, following campus tradition, is a colonial brick building, planned and built to present modern equipment and facilities for education in home economics. A management center is maintained on the campus for resident experiences in management activities of family life.

Located between two large cities, unusual opportunities are provided for both faculty and students. In addition to the University's general and specialized libraries, Baltimore and Washington furnish added library facilities. The art galleries and museums, the government bureaus and city institutions stimulate study and provide enriching experiences for home economics students.

## SPECIAL FACILITIES AND ACTIVITIES

### SOCIETIES

Home Economics Chapter: Membership is open to all home economics students. The club is affiliated with the Maryland and American Home Economics Associations.

Omicron Nu, national home economics honor society: Students of high scholarship are eligible for election to membership.

N.S.I.D.: A student chapter affiliated with the National Society of Interior Designers.

Gamma Alpha Chi: National professional advertising fraternity for women.

Student Faculty Council: An advisory group, elected by students and faculty, to promote the interests of the College of Home Economics.

### *Honors and Awards, Scholarships and Loan Fund*

The Danforth Foundation and the Ralston Purina Company Summer Fellowships: One of four weeks to an outstanding junior; one of two weeks to an outstanding freshman.

Omicron Nu Scholarship Award: Omicron Nu presents annually an award to the sophomore in the College of Home Economics who attained the highest scholastic average during the freshman year.

M. Marie Mount Memorial Scholarship: \$250 is awarded each year to a junior or senior student who shows outstanding potential as a professional home economist.

Sears Roebuck Scholarships: The Sears Roebuck Foundation has made available to freshmen in the College of Home Economics two scholarships of \$300 each.

Venia M. Kellar Grant: A grant of \$100 is open to a Maryland student of promise who wishes to enroll in the College of Home Economics.

A loan fund, composed of contributions by the District of Columbia Home Economics Association, Maryland Chapter of Omicron Nu, and personal gifts, is available for students majoring in home economics.

Home Economics Senior Award: The Home Economics Alumni annually present an award to the senior student who is outstanding in her application of the spirit and principles of home economics in her present living and who best shows promise of carrying these into her future home and community.

For other scholarships and awards, see *An Adventure in Learning*, the general undergraduate catalog of the University.

## ACADEMIC INFORMATION

### *Admission*

#### FALL SEMESTER

All applications for full-time undergraduate admission for the Fall Semester at the College Park Campus must be received by the University on or before July 15. Any student registering for nine or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between July 15 and September 1. Applicants for full-time attendance filing after July 15 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by September 1.

#### SPRING SEMESTER

The deadline for the receipt of applications for the Spring Semester is January 1.

#### UNIVERSITY COLLEGE

The application deadlines and fees *do not* apply to students registering in the evening classes offered by the University College.

#### GRADUATE SCHOOL

Application for admission to the Graduate School must be made by August 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the Summer School catalog. The summer session deadline date is June 1.

All students desiring to enroll in the College of Home Economics must apply to the Director of Admissions of the University of Maryland at College Park.

In selecting students emphasis will be placed upon good marks and other indications of probable success in college as well as upon the pattern

## ACADEMIC INFORMATION

of subjects pursued in high school. In general, four units of English and one unit each of social and natural sciences, algebra and plane geometry are required. While foreign language is desirable for certain programs no foreign language is required for entrance.

### *Costs<sup>1</sup>*

Actual annual costs of attending the University include \$250.00 fixed charges; \$96.00 special fee; \$420.00 board; \$320.00 lodging for Maryland residents or \$420.00 for residents of other states and countries. A charge of \$400.00 is assessed students not residents of the State of Maryland. A matriculation fee of \$10.00 is charged all new students. A fee of \$10.00 must accompany a prospective student's application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee.

*An Adventure in Learning*, the undergraduate catalog of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park 20742.

### *Degrees*

The degree of Bachelor of Science is conferred for the satisfactory completion, with an average of "C" or better, of a prescribed curriculum of 120 academic semester hour credits. This is exclusive of health and physical activities for women and men. No grade below a "C" is acceptable in courses within the field chosen as a major.

The Master of Science degree is offered in food, nutrition and institution administration; in textiles and clothing; and in related areas of home economics in the College of Home Economics, also in home economics education in the College of Education. (See the *Graduate School Catalog*.)

### *Air Science Instruction*

Selected students who wish to do so may carry Advanced Air Science courses during their junior and senior years which may lead to a regular or reserve commission in the United States Air Force.

For details concerning Air Science, refer to *University General and Academic Regulations*, a publication available to all entering undergraduate students.

### *The Student Load*

The student load in the College of Home Economics varies from 15-19 credits. A student wishing to carry more than 19 credits must have a "B" grade average and permission of the Dean.

---

<sup>1</sup>Effective September, 1966, fixed charges will be \$270, and board charges will be \$440.

A minimum of 120 academic credits are required for graduation. However, for certification in some professional organizations additional credits are required. Consult with the adviser.

### *Curricula*

A student may elect one of the following curricula, or a combination of curricula: food, nutrition or institution administration (food service); general (foundation) home economics; home economics education; home economics extension; housing, applied design or crafts; textiles or textiles and clothing. A student who wishes to teach home economics may register in home economics education in the College of Home Economics or in the College of Education.

### *General Education Program*

A college education implies something more than an adequate technical training in the student's field of specialization. In order that each graduate with a Bachelor's degree may gain a liberal education as well as a specialized one, the University has established a General Education Requirement. This requirement consists of 34 semester hours of credit in six general fields. There is a wide choice in specific courses which may be used to satisfy requirements in all of the six fields except English. Physical Education and Health requirements for all students are taken in addition to this 34-hour group of courses.

Although the courses in the General Education Program are prescribed generally, some choice is permitted, especially for students who demonstrate in classification tests good previous preparation in one or more of the required subjects. For a more complete description of the program refer to *General and Academic Regulations*, pages 27-30.

### *General Information*

Detailed information concerning the General Education Program, fees and expenses, scholarships and awards, student life, and other material of a general nature, may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park 20742. A detailed explanation of the regulations of student and academic life may be found in the University publication titled, *General and Academic Regulations*.

## ACADEMIC INFORMATION

Requests for course catalogs for the individual schools and colleges should be directed as follows:

### COLLEGES LOCATED AT COLLEGE PARK:

Dean  
(College in which you are interested)  
The University of Maryland  
College Park, Maryland 20742

### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean  
(School in which you are interested)  
The University of Maryland  
Lombard and Greene Streets  
Baltimore, Maryland 21201

# Required Courses

THE CURRICULA LEADING TO A MAJOR IN THE COLLEGE OF HOME ECONOMICS are organized into three categories: (1) Technical areas, (2) educational, community, and family life areas, and (3) commercial consumer service (related art) areas. These represent the broad professional fields into which graduates are eligible to enter and pursue their chosen work. The positions vary in nature, scope, and title but require similar general studies background and fundamentals for specialization.

Individual programs of study are developed cooperatively with faculty advisers to provide a balanced and sequential arrangement of studies in preparation for the chosen field. University, college, departmental, and interdepartmental requirements are identified for curricula in each of the categories described above.

All students in the College of Home Economics are required to complete a series or sequence of courses to satisfy University requirements and departmental requirements. The remaining courses needed to complete a program of study are elected by the student with the approval of his adviser.

	Semester Credit
	Hours
UNIVERSITY REQUIREMENTS (General Education—Academic)	
English 1, 3, and 4	9
Fine Arts or Philosophy (choice of one)	3
Dance 32, 182, 184	
Art 10, 60, 61, 65, 66, 67, 68, 70, 71, 80	
Music 20	
Speech 16, 114	
Philosophy 1, 41, 45, 52, 53, 147, 152, 154	
History (one course in U. S., one non-U. S.)	6
U. S. History 21, 22, 23, 24, 29	
Non-U. S. History 31, 32, 41, 42, 51, 52, 53, 54, 61, 62, 71, 72	
Mathematics (any credit bearing course)	3-4
ACT score determines qualification	
Natural Science (choice of two courses) <sup>2</sup>	7
One course must be a physical science; one a biological science	
Social Science (choice of two courses)	6
Soc. 1; G & P 1 or 3; Anthropology 1; Econ. 37 or 31; Psych. 1	
Total	34-35
UNIVERSITY REQUIREMENTS (non-academic)	
For men and women:	
Health 5	2
Physical Education—2 semesters	2
Total	4

<sup>2</sup>Dependent upon science requirements of curriculum.

## DEPARTMENTAL REQUIREMENTS

### COLLEGE OF HOME ECONOMICS REQUIREMENTS for every student<sup>4</sup>

H. E. 5—Introduction to Family Living Through Home Economics <sup>4</sup>	2
A. D. 1—Fundamentals of Design <sup>4</sup>	3
T. & C. 5—Textiles and Clothing in Contemporary Living <sup>4</sup>	3
F. & N. 5—Food and Nutrition of Individuals and Families <sup>4</sup>	3
H. M. 50—Decision Making in Family Living <sup>4</sup>	3
H. M. 160—Scientific Management in the Home	3
H. M. 161—Resident Experience in Home Management	3
Nutr. 20—Elements of Nutrition OR	
Nutr. 121—Science of Nutrition	3
Food 150—Food Economics and Meal Management <sup>5</sup>	3
H. E. 180—Professional Seminar (men and women)	2

### ROOT DISCIPLINE REQUIREMENTS OUTSIDE THE COLLEGE

Soc. 1—Sociology of American Life <sup>3</sup>	3
Psych. 1—Introduction to Psychology <sup>3</sup>	3
Econ. 37—Fundamentals of Economics <sup>3</sup>	3
Speech 7 or 1—Public Speaking	2-3

## DEPARTMENTAL REQUIREMENTS

Required courses are determined by the department making major contributions to the specific curriculum or program of study. Supporting and elective courses are approved by the adviser of the student's program.

The program of courses for the freshman year is essentially the same for all students. However, there are some variations and modifications in several curricula.

### SUGGESTED FRESHMAN YEAR (15 to 18 hours each semester)<sup>6</sup>

	<i>Semester Hours</i>
Eng. 1, 3—Composition and Literature	6
Mathematics	0-3
H. E. 5—Introduction to Family Living	2
A. D. 1—Fundamentals of Design	3
Speech 7 or 1—Public Speaking	2-3
Soc. 1—Sociology of American Life	3
F. & N. 5—Food and Nutrition of Individuals and Families	3
T. & C. 5—Textiles and Clothing in Contemporary Living	3
Physical or Biological Science	3-6
Health 5	2
Physical Education	2
Electives <sup>7</sup>	2

<sup>3</sup>Any two of these automatically satisfy the 6-hour social science requirement of General Education.

<sup>4</sup>Men are required to take a minimum of two courses from this group.

<sup>5</sup>Except I. A. majors.

<sup>6</sup>See P. 18 for Home Economics Education.

<sup>7</sup>Clo. 10 required for Textiles and Clothing majors.

## HOME ECONOMICS IN TECHNICAL AREAS

Preparation for entering technical fields in home economics and related areas combines a strong scientific background with general education, an understanding of personal and family life, and specific knowledge in one or more of the areas leading to technical positions. Curricula or programs of study offered in the several departments directed toward the following can be pursued by undergraduate students: Textile technology, commercial foods, fashion merchandising and design, hospital and institution dietetics, advertising layout and promotion, basic and applied research in the several areas of home economics, apparel design and construction, nutrition and related science, family life, and household equipment (technology and utilization).

### TECHNICAL CURRICULA

University requirements (see page 7)

College of Home Economics requirements (see page 8)

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

Graduates of the food and nutrition curriculum find positions in the consumer education departments of a wide variety of food and equipment industries, magazine and advertising firms, doing testing, editorial, or promotion work. They may become nutritionists with industry or in state or community programs. The curriculum also prepares students for graduate study, research, or work as laboratory technicians.

The institution administration curriculum prepares students for food service administration in such institutions as hospitals, colleges, and public schools; in commercial organizations: restaurants, inns, hotels, and industrial food service. Institution administration majors meet the academic requirements for entrance to a dietetic internship approved by the American Dietetic Association. Students following this major are required to have, before the senior year, field experience in food service. This experience must be satisfactory in length of time, type, and quality of work.

Men specializing in either the food and nutrition or institution administration major will be allowed substitutions for certain required courses.

# FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

## FOOD AND NUTRITION CURRICULUM

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature.....	(3)	3
Chem. 31, 33—Organic Chemistry.....	3	3
Psych. 1—Introduction to Psychology.....	3	(3)
Econ. 37—Fundamentals of Economics.....	(3)	3
Food 10 (3)—Science Principles of Food or		
Food 52, 53 (6)—Science of Food Preparation.....	3	..
Zool. 1—General Zoology.....	4	..
Microb. 1—Gen. Microbiology <sup>8</sup> .....	..	4
H. M. 50—Decision Making in Family Living.....	3	..
Elective.....	..	3
	<hr/>	<hr/>
Total.....	16	16
<b>JUNIOR YEAR</b>		
Home Mgt. 160—Scientific Management in the Home.....	(3)	3
Food 150—Food Economics and Meal Management.....	..	3
Nutr. 121—Science of Nutrition.....	3	..
F. & N. 130—Special Problems in Food and Nutrition.....	..	3
H. D. Ed. 107—Growth and Development in Early Childhood or		
F. L. 132—The Child in the Family.....	3	(3)
Hist. 21 and 31 or alternatives.....	3	3
A. D. 2—Survey of Art History (or Tex. & Clo.) <sup>9</sup> .....	2	..
Chem. 161, 163—Biochemistry (2, 2) <sup>10</sup> .....	2	2
Electives <sup>11</sup> .....	4	4
	<hr/>	<hr/>
Total.....	17	18

<sup>8</sup>May be taken in junior year.

<sup>9</sup>Selected with adviser's consent.

<sup>10</sup>May be taken in senior year.

<sup>11</sup>Zool. 14, 15—Human Anatomy and Physiology necessary for students expecting to meet ADA requirements.

# FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

SENIOR YEAR	Semester	
	I	II
Home Mgt. 161—Resident Experience in Home Mgt. or Home Mgt. 165—Home Mgt. Practicum <sup>12</sup>		3
Food 152—Advanced Food Science	3	
Food 153—Experimental Food Science		3
H. E. 180—Professional Seminar	(2)	2
Select at least two of the following:	3	3
H. E. 170—Communication Skills and Techniques in Home Economics		
Nutr. 124—Advanced Nutrition		
Nutr. 125—Therapeutic Nutrition <sup>14</sup>		
Fine Arts or Philosophy	3	
Electives (100 level courses)	6-8	5
Total	15-17	16

## INSTITUTION ADMINISTRATION CURRICULUM

### SOPHOMORE YEAR

Eng. 4—Composition and World Literature	3	(3)
Chem. 31, 33—Organic Chemistry	3	3
Food 52, 53—Science of Food Preparation or Food 10—Science Principles of Food	(3)	3
Econ. 37—Fundamentals of Economics		3
A.D. 2—Survey of Art History (or Tex. & Clo.) <sup>13</sup>	2	
Psych. 1—Introduction to Psychology	3	
Zool. 1—General Zoology	4	
Microb. 1—General Microbiology		4
Home Mgt. 50—Decision Making in Family Living		3
Electives	3	
Total	18	16

### JUNIOR YEAR

Home Mgt. 160—Scientific Management in the Home		3
Nutr. 121—Science of Nutrition	3	
I. A. 153—Food Service Organization and Management		2
Chem. 161, 163—Biochemistry <sup>15</sup>	2	2
I. A. 150—Institution Organization and Management	3	
I. A. 151—Institution Purchasing and Accounting		3
H. D. 107—Growth and Development in Early Childhood or F. L. 132—The Child in the Family	3	(3)
Food 152—Advanced Food Science	3	
Food 153—Experimental Food Science		3
Zool. 14, 15—Human Anatomy and Physiology <sup>13</sup>	4	4
Total	18	17

<sup>12</sup>Consent of Dept. of Family Life and Management.

<sup>13</sup>Selected with adviser's consent.

<sup>14</sup>A.D.A. academic requirement.

<sup>15</sup>A.D.A. requires Biochem. with laboratory.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

SENIOR YEAR	Semester	
	I	II
Hist. 21 and 31 or alternatives .....	3	3
Home Mgt. 161—Resident Experience in Home Mgt. or Home Mgt. 165—Home Management Practicum <sup>16</sup>	(3)	3
Nutr. 124—Advanced Nutrition .....	3	..
I. A. 152—Institution Foods .....	3	..
Psych. 110—Educational Psychology .....	..	3
H. E. 180—Professional Seminar .....	2	..
Fine Arts or Philosophy .....	3	..
Electives (100 level courses) .....	3	6-9
Total .....	17	15-18

## TEXTILES AND CLOTHING

The curricula in textiles and clothing are planned to help students be intelligent and responsible consumers; to give them preliminary training for positions in textiles and clothing in business, in textile testing, and research in textiles and clothing.

Men majoring in these curricula will be allowed substitutions for certain required courses and will choose supporting courses according to their professional interests and needs.

### TEXTILES CURRICULUM

SOPHOMORE YEAR	Semester	
	I	II
Eng. 4—Composition and World Literature .....	3	(3)
Clo. 10—Principles and Methods of Clothing Design .....	2	(2)
Econ. 37—Fundamentals of Economics .....	3	(3)
Psych. 1—Introduction to Psychology .....	3	(3)
A. D. 20—Costume Design .....	(3)	3
Chem. 1, 3 or 11, 13—General Chemistry <sup>17</sup> or elective .....	3-4	3-4
Clo. 11—Experimental Clothing Design or Clo. 21—Pattern Design .....	(2-3)	2-3
Tex. 55—Elements of Textiles .....	3	..
H. M. 50—Decision Making in Family Living .....	..	3
Electives .....	..	3
Total .....	17-18	14-16

<sup>16</sup>Consent of Dept. of Family Life and Management.

<sup>17</sup>Unless taken in Freshman year.

## TEXTILES AND CLOTHING

JUNIOR YEAR	Semester	
	I	II
Home Mgt. 160—Scientific Management in the Home		3
Nutr. 20—Elements of Nutrition or		
Nutr. 121—Science of Nutrition	3	(3)
Fine Arts Elective		3
Phys. 1, 2—Elements of Physics	3	3
Chem. 31, 33—Organic Chemistry	3	3
Food 150—Food Economics and Meal Management	3	
B. A. 130—Elements of Business Statistics		3
Elective	3	
Total	15	15
SENIOR YEAR		
Hist. 21, 31 or alternatives	3	3
Home Mgt. 161—Resident Experience in Home Mgt. or		
Home Mgt. 165—Home Mgt. Practicum <sup>18</sup>		3
Chemistry <sup>19</sup>	4	
Tex. 150—Advanced Textiles	3	
Tex. 102—Textile Testing		3
Speech <sup>19</sup>		3
H. D. Ed. 107—Growth and Development in Early Childhood or		
F. L. 132—The Child in the Family	3	
H. E. 180—Professional Seminar	2	
Electives		4
Total	15	16

## TEXTILES AND CLOTHING CURRICULUM

### SOPHOMORE YEAR

Eng. 4—Composition and World Literature	3	(3)
Econ. 37—Fundamentals of Economics		3
Psych. 1—Introduction to Psychology	3	(3)
A. D. 20—Costume Design	(3)	3
Science	(4)	4
Clo. 11—Experimental Clothing Design	2	(2)
Clo. 21—Pattern Design	(3)	3
Tex. 50—Consumer Textiles	3	(3)
H. M. 50—Decision Making in Family Living	3	
Elective		3
Total	14	16

<sup>18</sup>Consent of Dept. of Family Life and Management.

<sup>19</sup>Selected with adviser's consent.

## TEXTILES AND CLOTHING

JUNIOR YEAR	Semester	
	I	II
Philosophy or Fine Arts . . . . .	..	3
Home Mgt. 160—Scientific Management in the Home . . . . .	3	(3)
Nutr. 20—Elements of Nutrition . . . . .	..	3
Clo. 122—Tailoring . . . . .	2	..
Art <sup>20</sup> . . . . .	3	..
Psychology <sup>20</sup> . . . . .	..	3
Food 150—Food Economics and Meal Management . . . . .	(3)	3
H. D. Ed. 107—Growth and Development in Early Childhood or F. L. 132—The Child in the Family . . . . .	3	..
Tex. 153—International Textiles . . . . .	2	..
Choice of course in Dept. or H. E. 170—Communication Skills and Techniques in Home Economics . . . . .	..	3
Electives . . . . .	3	..
Total . . . . .	16	15
SENIOR YEAR		
Hist. 21 and 31 or alternate . . . . .	3	3
Home Mgt. 161—Resident Experience in Home Mgt. or Home Mgt. 165—H. Mgt. Practicum <sup>21</sup> . . . . .	3	(3)
Clo. 120—Draping . . . . .	3	..
T. & C. 126—Fundamentals of Fashion . . . . .	..	3
Speech <sup>20</sup> . . . . .	3	(3)
H. E. 180—Professional Seminar . . . . .	2	(2)
Electives . . . . .	..	9
Total . . . . .	14	15

## HOME ECONOMICS IN EDUCATIONAL, COMMUNITY AND FAMILY LIFE AREAS

Students selecting programs of study or major in this area may choose one of the several avenues in preparing for teaching or positions involving person-to-person relationships at different age levels. These study programs provide a broad general education, an understanding of family life in today's world, and preparation for specific positions.

University Requirements (see page 7)

College of Home Economics requirements (see page 8)

<sup>20</sup>Selected with adviser's consent.

<sup>21</sup>Consent of Dept. of Family Life and Management.

## EXTENSION HOME ECONOMICS CURRICULUM

This curriculum provides preparation for positions in extension home economics. It includes the basic sciences and the technical subjects related to farm, home, and community situations which home demonstration agents encounter.<sup>22</sup>

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature...	3	
Chem. 31, 33—Organic Chemistry <sup>23</sup> ...	3	3
Choice of (6 hrs.) from		
Food 52, 53—Science of Food Preparation		
F. & N. 5—Food and Nutrition of Individuals and Families	3	3
Food 10—Science Principles of Food		
Econ. 37—Fundamentals of Economics	3	
Clo. 10—Principles and Methods of Clothing Design	2	
Psych. 1—Introduction to Psychology		3
Clo. 21—Pattern Design		3
Home Mgt. 50—Decision Making in Family Living		3
Total	14	15
<b>JUNIOR YEAR</b>		
Home Mgt. 160—Scientific Management in the Home		3
R. Ed. 160—Agricultural Information Methods	2	
Nutr. 121—Science of Nutrition	3	
Hist. 21 and 31 or alternatives	3	3
Choice of (6 hrs.) from:		
H.D.Ed. 100, 101—Principles of Human Dev. I & II		
F.L. 132—The Child in the Family		
F.L. 135—Directed Experiences with Children and Families	3	3
A. D. 2—Survey of Art History		2
R. Ed. 150—Extension Education		2
Zool. 1—General Zoology		4
Fd. 150—Food Economics and Meal Management	3	
Total	14	17

<sup>22</sup>Experience in the field of home economics extension is encouraged for all students majoring in this curriculum. Such experience should be gained before the completion of the senior year.

<sup>23</sup>Chem. 31, 33 is recommended for students with special interest in and need for food and nutrition.

## FAMILY LIFE OR GENERAL

SENIOR YEAR	Semester	
	I	II
Home Mgt. 161—Resident Experience in Home Management or Home Mgt. 165—Home Management Practicum <sup>24</sup>	3	
H. E. 170—Communication Skills and Techniques in H. E.		3
Soc. 113—The Rural Community		3
Fine Arts or Philosophy	3	
T. & C. 128—Fundamentals of Home Furnishings		3
H. E. Ed. 102—Problems in Teaching Home Economics	3	
H. E. 180—Professional Seminar		2
Nutr. 124—Advanced Nutrition	3	
Micro. 1—General Microbiology	4	
Electives		3-4
Total	16	14-15

## FAMILY LIFE OR GENERAL (FOUNDATION) CURRICULUM

The general (foundation) home economics curriculum is planned to provide students with a good basis for personal development, for education in family living, and for professional opportunities requiring a general knowledge of the various areas of home economics. Electives are adequate for developing a special ability or interest, such as: music, social science, speech, journalism, or general education.

SOPHOMORE YEAR	Semester	
	I	II
Eng. 4—Composition and World Literature	(3)	3
Food 52, 53—Science of Food Preparation or Food 10—Science Principles of Food	3	(3)
Econ. 37—Fundamentals of Economics	3	
Microb. 1—General Microbiology		4
Clo. 10—Principles and Methods of Clothing Design	2	
A. D. 20—Costume Design		3
H. M. 50—Decision Making in Family Living	3	
Electives <sup>25</sup>	3-6	3-6
Total	14-17	13-16

<sup>24</sup>Consent of Dept. of Family Life and Management.

<sup>25</sup>Chem. 31, 33 recommended as an elective for students with special interest in and need for food and nutrition.

## EDUCATION

	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Fine Arts or Philosophy	3	
Home Mgt. 160—Scientific Management in the Home		3
Nutr. 121—Science of Nutrition or		
Nut. 20—Elements of Nutrition	3	
A. D. 2—Survey of Art History	2	
H.A.D. 41—Fundamentals of Interior Design		3
Clo. 11—Experimental Clothing Design or		
Clo. 21—Pattern Design		2-3
Food 150—Food Economics and Meal Management		3
Zool. 1—General Zoology	4	
Psych. 1—Introduction to Psychology		3
Electives (100 level courses)	3	3
<b>Total</b>	<b>15</b>	<b>17-18</b>
<b>SENIOR YEAR</b>		
H. D. Ed. 107—Growth and Development in Early Childhood or		
F. L. 132—The Child in the Family		
F. L. 135—Directed Experiences with Children and Families	3	
Hist. 21 and 31 or alternatives	3	3
Home Mgt. 161—Resident Experience in Home Management or Home Mgt. 165—Home Management Practicum <sup>26</sup>		3
H. E. 180—Professional Seminar	2	
H. E. 170—Communication Skills and Techniques in Home Economics <sup>27</sup>		3
Electives (100 level courses)	8	6
<b>Total</b>	<b>16</b>	<b>15</b>

## HOME ECONOMICS EDUCATION CURRICULUM

Students electing this curriculum may be registered in the College of Home Economics or in the College of Education.

The home economics education curriculum is designed for students who are preparing to teach home economics (vocational or general) and to support other areas of home economics which require a knowledge of teaching methods. It includes some study of each area of home economics and allied sciences with professional preparation for teaching. A student majoring in this curriculum may qualify for a science minor.

<sup>26</sup>Consent of Dept. of Family Life and Management.

<sup>27</sup>A substitute may be arranged with consent of adviser.

# HOME ECONOMICS EDUCATION

	Semester	
	I	II
<b>FRESHMAN YEAR</b>		
Eng. 1—Composition and American Literature	3	..
Soc. 1—Sociology of American Life or Psych. 1—Intro. to Psychology or Anthropology	3	..
H. E. 5—Introduction to Family Living through H. E.	2	..
F. & N. 5—Food and Nutrition of Individuals and Families	3	..
A. D. 1—Design	..	3
Hea. 5	..	2
P. E. 2 & 4	1	1
G. & P. 1—American Government	..	3
Sp. 1—Public Speaking	..	3
Math. 3	4	..
Electives	..	3-4
Total	16	15-16
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature	3	3
Hist. 21, 31 or alternate	3	3
A. D. 20—Costume Design	..	3
Tex. and Clo. 5—Textiles and Clothing in Contemporary Living	3	..
Clo. 10—Principles and Methods of Clothing Design	..	2
Chem. 11, 13 or 1, 3—General Chemistry	3-4	3-4
Food 10—Scientific Principles of Food	..	3
Fine Arts or Philosophy	3	..
Total	15-16	17-18
<b>JUNIOR YEAR</b>		
H. E. Ed. 102—Problems in Teaching Home Economics	3	..
Ed. 110—Human Development and Learning	6	..
H. Mgt. 50—Decision-making in Family Living	3	..
Food 150—Food Economics and Meal Management	..	3
H. Mgt. 160—Scientific Management in the Home	..	3
Nutr. 20—Elements of Nutrition or Nutr. 121—Science of Nutrition	..	3
Clo. 11—Experimental Clothing Design	2	..
Econ. 37—Fundamentals of Economics	..	3
Zool. 1—General Zoology	4	..
Bot. 1—General Botany <sup>28</sup>	..	4
Total	18	16

<sup>28</sup>Chem. 31, 33 recommended in lieu of Botany for students with special interest in and need for food and nutrition.

## HOME ECONOMICS EDUCATION

	Semester	
	I	II
<b>SENIOR YEAR<sup>29</sup></b>		
Sec. Ed. 140—Curriculum, Instruction and Observation . . .	3	..
Sec. Ed. 145—Principles and Methods of Secondary Education . . .	3	..
Sec. Ed. 148—Teaching Secondary Vocational Home Economics . . .	8	..
H. Mgt. 161—Resident Experience in Home Management or H. Mgt. 165—Home Management Practicum . . .	3	..
Ed. 111—Foundations of Education <sup>30</sup> . . .	..	3
A. D. 2—Survey of Art History or T. & C. 128—Fundamentals of Home Furnishing . . .	..	2-3
Microb. 1—General Microbiology . . .	..	4
Electives <sup>31</sup> . . .	..	7-8
<b>Total</b> . . .	<b>17</b>	<b>16-18</b>

## HOME ECONOMICS IN APPLIED ART AREAS

The fundamental purposes of programs of study in these areas are to provide a broad general education, and instruction in the design and use of materials for the individual, the home, and the community. The commercial field offers graduates positions in designing interiors, fashions, advertising, home furnishings, and technical materials. Positions available also include promotion, and selling or buying of wearing apparel and home furnishings.

### HOUSING AND APPLIED DESIGN

This curriculum permits a choice of three areas of concentration: Applied (Art) Design in advertising, interiors, and costume.

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Eng. 4—Composition and World Literature . . .	(3)	3
Econ. 37—Fundamentals of Economics . . .	3	..
Psych. 1—Introduction to Psychology . . .	3	..
H. M. 50—Decision Making in Family Living <sup>3</sup> . . .	..	3
A. D. 20—Costume Design . . .	3	(3)
A. D. 21—Action Drawing . . .	..	2
A. D. 30—Typography and Lettering . . .	3	..
H.A.D. 41—Fundamentals of Interior Design . . .	(3)	3
A. D. 2—Survey of Art History . . .	2	..
Science Requirement . . .	..	4
Elective <sup>32</sup> . . .	..	1-3
<b>Total</b> . . .	<b>14</b>	<b>16-18</b>

<sup>29</sup>Subjects in the block are so arranged that the two semesters may be interchanged.  
<sup>30</sup>May be taken either semester. Limited to students who have been admitted to teacher education.

<sup>31</sup>H. Ec. 180—Professional Seminar (required of seniors in College of H. Ec.) (2)

<sup>32</sup>Clo. 10 required for Costume majors; H. A. D. 40 required for Interiors majors.

## HOUSING AND APPLIED (ART) DESIGN

	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Home Mgt. 160—Scientific Management in the Home . . .	..	3
Food 150—Food Economics and Meal Management . . . . .	3	..
Nutr. 20—Elements of Nutrition . . . . .	..	3
A. D. 120, 121—Costume Illustration or H.A.D. 142, 143—Advanced Interior Design . . . . .	2	2
Choice of one of the following groups: . . . . .	3	3
Advertising: Crafts A. D. 4—3-Dimensional Design A. D. 3—Silk Screen Printing Costume: Clo. 120—Draping Tex. <sup>35</sup> Interior: H. A. D. 46 or Tex. <sup>35</sup>		
B. A. 149—Marketing Principles and Organizations <sup>33</sup> . . . . .	3	..
B. A. 154—Retail Store Management <sup>33</sup> . . . . .	..	3
A. D. 38—Photography . . . . .	..	2
A. D. 132—Advertising Layout . . . . .	2	(2)
107—Growth and Development in Early Childhood Fine Arts or Philosophy . . . . .	3	..
<b>Total</b> . . . . .	<b>16</b>	<b>16</b>
<b>SENIOR YEAR</b>		
Hist. 21 and 31 or alternatives . . . . .	3	3
Home Mgt. 161—Resident Experience in Home Mgt. or Home Mgt. 165—Home Mgt. Practicum <sup>34</sup> . . . . .	(3)	3
H. D. Ed. 110— F. L. 132—The Child in the Family . . . . .	(3)	3
Speech 115—Radio in Retailing <sup>33</sup> . . . . .	3	..
A. D. 136—Display . . . . .	2	(2)
Individual Problems in Advertising, Costume or Interior . . . . .	2	2
H. E. 180—Professional Seminar . . . . .	(2)	2
B. A. Requirement <sup>35</sup> . . . . .	3	..
Electives <sup>35</sup> . . . . .	2-4	2-3
<b>Total</b> . . . . .	<b>15-17</b>	<b>15-16</b>

<sup>33</sup>Women students desiring a non-business program may substitute 12 credit hours of one foreign language plus 3-6 credits from the arts, humanities or journalism.

<sup>34</sup>Consent of Dept. of Family Life and Management.

<sup>35</sup>Selected with consent of adviser.

*Modifications of Applied Design and Crafts Curriculum for Men*

Requirements are the same as for women with the following exceptions:

*Additions:*

Additional courses selected in consultation with adviser.

Choice of 1 of the following *college requirements*; (See page 8)

H. E. 5—Introduction to Family Living through Home Economics

F & N 5—Food and Nutrition of Individuals and Families

T & C 5—Textiles and Clothing in Contemporary Living

H. M. 50—Decision Making in Family Living

*Omissions:*

Food 150; Home Mgt. 160, 161; Nutr. 20.

## CRAFTS CURRICULUM

This curriculum provides for a choice of two vocational areas: Pre-occupational therapy and teaching.

SOPHOMORE YEAR	Semester	
	I	II
Eng. 4—Composition and World Literature.....	3	(3)
Econ. 37—Fundamentals of Economics.....	3	..
Psych. 1—Introduction to Psychology.....	..	3
A. D. 3—Silk Screen Printing.....	..	2
A. D. 4—3-Dimensional Design.....	2	..
Cr. 2—Simple Crafts.....	2	..
Cr. 20, 21—Ceramics.....	2	2
Science Requirement <sup>36</sup> .....	..	3-4
H. M. 50—Decision Making in Family Living.....	..	3
Electives.....	..	3
Fine Arts or Philosophy.....	3	..
Total.....	15	16-17

<sup>36</sup>Selected with adviser's consent.

## CRAFTS

	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Hist. 21 and 31 or alternatives	3	3
H. M. 160—Scientific Management in the Home	..	3
Nutr. 20—Elements of Nutrition	..	3
Cr. 30, 31—Metalry	2	2
Cr. 40, 41—Weaving	2	2
Food 150—Food Economics and Meal Management	3	..
Ind. Ed. 2—Woodworking I	..	3
Ind. Ed. 9—Industrial Arts in the Elementary School I	2	..
Electives <sup>37</sup> (100 level courses)	4-7	2
	16-19	18
<b>SENIOR YEAR</b>		
	I	II
H. M. 161—Resident Experience in H. E.	3	..
A. D. 38—Photography	2	..
Advanced crafts	4	2
Electives <sup>37</sup>	7	12
	16	14

(Note: For other curricula in art, see offerings in the Colleges of Arts and Sciences and Education)

---

<sup>37</sup>One of the two following blocks of courses will be completed to meet graduation requirements.

### *I—Pre-Occupational Therapy*

Zool. 1—General Zoology (4)  
 Zool. 14, 15—Human Anatomy & Physiology (4, 4)  
 Phys. 1—Elements of Physics (3)  
 P. E. 100—Scientific Bases of Movement (3)  
 Art requirement (3)

### *II—Teaching*

Ed. 110—Human Development and Learning (6)  
 Sec. Ed. 130—The Junior High School (3)  
 Sec. Ed. 140—Curr., Instruction and Observation (3)  
 Sec. Ed. 145 — Prin. of High School Teaching (3)  
 Sec. Ed. 148—Student Teaching (8)

# Course Offerings

The University reserves the right to withdraw or discontinue any course for which an insufficient number of registering students warrant offering the course. In such an event, no fee will be charged for transfer to another course.

Courses are designated by numbers as follows:

1 to 99: Courses for undergraduates.

100 to 199: Courses for advanced undergraduates and graduates.  
(Not all courses numbered 100 to 199 may be taken for graduate credit.)

200 to 299: Courses for graduates only.

399: Graduate research.

A course with a single number extends through one semester. A course with a double number extends through two semesters.

Courses not otherwise designated are lecture courses. The number of credit hours is shown by the Arabic numeral in parentheses after the title of the course.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his program. Students obtain these schedules shortly before they register.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

*Associate Professors:* BRAUCHER, BROWN.

*Assistant Professors:* BANGS, COLLINS, EHEART.

*Instructors:* HARWOOD, KNIGHTON, LANZ, MCKINLEY.

### FOOD

#### F. & N. 5. FOOD AND NUTRITION OF INDIVIDUALS AND FAMILIES. (3)

First and second semesters. Two lectures and one two-hour laboratory period a week. Consent of instructor. Laboratory fee, \$3.00. A study of food in contemporary living. The economic, social and esthetic implications of food as well as its nutritive value. Selection and use of food in relation to eating habits, health, and well-being of the individual. Survey of meal preparation and service applied to family situations.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

### FOOD 10. SCIENCE PRINCIPLES OF FOOD. (3)

First and second semesters. Two lectures and one two-hour laboratory period a week. Laboratory fee, \$10.00. Prerequisite or concurrent. Chem. 11, 13. Study of basic scientific principles as applied to food preparation processes.

### FOOD 52, 53. SCIENCE OF FOOD PREPARATION. (3, 3)

First and second semesters. One lecture and two laboratory periods a week. Prerequisites, Chem. 31, 33 to precede or parallel. Laboratory fee, \$10.00. Composition and structure of food with study of the fundamental principles involved in food preparation.

## NUTRITION

(See F. & N. 5)

### NUTR. 20. ELEMENTS OF NUTRITION. (3)

First and second semesters. Laboratory fee, \$3.00. For students in other colleges and for majors in crafts, applied art and textiles and clothing.

### *For Advanced Undergraduates and Graduates*

## FOOD

### F. & N. 130. SPECIAL PROBLEMS IN FOOD AND/OR NUTRITION. (1-3)

First and second semesters. Prerequisites, F. & N. 5. Food 10. and consent of instructor. Problem may be in any one of several areas of food and nutrition and will carry the name of the basic area; e. g., child nutrition, adolescent nutrition.

### FOOD 150. FOOD ECONOMICS AND MEAL MANAGEMENT. (3)

First and second semesters. Two lectures and one two-hour laboratory period a week. Consent of department. Laboratory fee, \$10.00. Distribution and marketing of the food supply; food costs; legal measures for consumer protection; retail selection of food commodities in relation to levels of spending; management of family meals through organization of equipment and appointments; time, energy, and money management for effective family living.

### FOOD 152. ADVANCED FOOD SCIENCE. (3)

First semester. Three lectures per week. Prerequisites, Chem. 31, 33 and Food 10 or equivalent. Physical and chemical properties of food as related to consumer use in the home and institutions.

### FOOD 153. EXPERIMENTAL FOOD SCIENCE. (3)

Second semester. One lecture, two laboratories per week. Prerequisite, Food 152 or equivalent. Individual and group laboratory experimentation as an introduction to methods of food research.

## NUTRITION

### NUTR. 121. SCIENCE OF NUTRITION. (3)

First semester. Prerequisites, Chem. 11, 13 or 1, 3, or consent of department. Two lectures and one two-hour laboratory period a week. An understanding of the chemical and physiological utilization of nutrients present in the various foods as related to individual human nutritional status, with studies in applied nutrition. Laboratory fee, \$3.00.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

### NUTR. 114. NUTRITION FOR HEALTH SERVICES. (3)

First and second semester. Prerequisite, Nutr. 20, Chem. 11, 13 or 1, 3 or equivalent. Laboratory fee, \$3.00. A study of nutritional status and the effect of food habits and food consumption on family health. Nutritional requirements for individuals in different stages of development. Techniques and procedures for the application of nutrition knowledge with consideration of various economic levels and social backgrounds. For graduate nurses, dietitians, health teachers, and social workers.

### NUTR. 124. ADVANCED NUTRITION. (3)

First semester. Prerequisites, Consent of department; Zool. 1; Chem. 161, 163 or concurrently. Laboratory fee, \$10.00. Two lectures and one two-hour laboratory. The progress of nutrition as found in the results of current research, with emphasis on interpretation and application.

### NUTR. 125. THERAPEUTIC NUTRITION. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisites, Nutr. 121, 124. Laboratory fee, \$3.00. Modifications of the normal adequate diet to meet human nutritional needs in pathological conditions.

### *For Graduates*

### FOOD <sup>38</sup>

### FOOD 200. ADVANCED EXPERIMENTAL FOOD. (3-5)

Second semester. Two lectures and three laboratory periods a week. Laboratory fee, \$10.00. Selected readings of literature in experimental foods. Development of individual problem.

### FOOD 204. RECENT TRENDS IN FOOD. (2-3)

First semester. Recent trends in the preparation, processing, and marketing of foods.

### FOOD 210. READINGS IN FOOD. (3)

First or second semester. Prerequisites, Food 152, 153. A critical survey of the literature of recent developments in food research.

### FOOD 220. SEMINAR. (1-2)

First and second semesters. Reports and discussions of current research in foods.

### FOOD 399. RESEARCH. (6)

First and second semesters. Credit in proportion to work done and results accomplished. Investigation in some phases of food which may form the basis for a thesis.

---

<sup>38</sup>Prerequisite for all 200 courses in Food and Nutrition, consent of department.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

### NUTRITION <sup>39</sup>

#### NUTR. 204. RECENT ADVANCES IN NUTRITION. (2-3)

First and second semester. Factors that affect the nutritive value of food during production, cookery processes, holding practices, processing, packaging, and storage.

#### NUTR. 208. RECENT PROGRESS IN HUMAN NUTRITION. (3)

Second semester. Recent developments in the science of nutrition with emphasis on the interpretation of these findings for application in health and disease. Aids for the dietitian in creating a better understanding of nutrition among patients, students of graduate status and personnel, such as those in the dental and medical professions.

#### NUTR. 210. READINGS IN NUTRITION. (3)

First and second semesters. Reports and discussions of significant nutritional research and investigation.

#### NUTR. 211. PROBLEMS IN NUTRITION. (3-5)

Second semester. Experience in a phase of nutrition research which is of interest to the student. Use of experimental animals, human studies and extensive and critical study of research methods, techniques or data of specific projects.

#### NUTR. 212. NUTRITION FOR COMMUNITY SERVICES. (3)

First semester. Application of the principles of nutrition to various community problems of specific groups of the public. Students may select problems for independent study.

#### NUTR. 220. SEMINAR. (1)

First and second semesters. Reports and discussions of current research in nutrition.

#### NUTR. 399. RESEARCH. (6)

First and second semesters. Credit in proportion to work done and results accomplished. Investigation in some phase of nutrition which may form the basis of a thesis.

*For Advanced Undergraduates and Graduates*

## INSTITUTION ADMINISTRATION

### I. A. 150. INSTITUTION ORGANIZATION AND MANAGEMENT. (3)

First semester. Prerequisite, F. & N. 5. Planning of functional kitchens for institutions and commercial food services. Equipment selection, maintenance, and layout. Field experiences and observations in a variety of situations.

---

<sup>39</sup>Prerequisites for all 200 courses in Food and Nutrition, consent of department.

## FOOD, NUTRITION, AND INSTITUTION ADMINISTRATION

### I. A. 151. INSTITUTION FOOD PURCHASING AND COST CONTROL. (3)

First and second semesters. Prerequisite, Food 10; Nutr. 20 or equivalent. Selection of food, methods and units of purchase in large quantities. Budgets, food cost accounting and control. Field experiences.

### I. A. 152. INSTITUTION FOODS. (3)

Second semester. One lecture and two laboratory periods a week. Prerequisites, Food 10; Nutr. 20 or 121; or consent of instructor. Laboratory fee, \$10.00. Application of basic principles and procedures of food preparation to quantity food preparation. Standardizing recipes; menu planning for various types of food services; determination of food costs.

### I. A. 153. FOOD SERVICE ORGANIZATION AND MANAGEMENT. (2)

Second semester. Prerequisite, consent of instructor. Application of principles of scientific management to the organization of food services. Efficient personnel management with emphasis on training and supervision of employees.

### I. A. 154. SCHOOL FOOD SERVICE. (3)

First semester. Two lectures and one morning a week for field experience in a school food service. Prerequisites, Food 10 and Nutr. 20 or 121, or consent of instructor. Not open to Institution Administration majors. Study of organization, management, menu planning, food purchasing and preparation, and cost control, for serving the noon meal in schools and child care centers.

### I. A. S166. NUTRITION AND MEAL PLANNING. (2)

Summer only. Special application to group food services: school lunches, restaurants, and hospitals.

### I. A. S168. COST ACCOUNTING FOR SCHOOL FOOD SERVICE. (2)

Summer session. Food cost accounting systems for school lunch programs: programs and procedures of accumulating, recording, and interpreting data for cost control.

### I. A S169. FOOD PURCHASING FOR SCHOOL FOOD SERVICE. (3)

Summer session. Purchasing procedures; grading, processing, and packing of food; selection of food, specifications, and marketing regulations.

### *For Graduates*

### I. A. 200. FOOD SERVICE ADMINISTRATION AND SUPERVISION. (3)

First semester. One lecture and two laboratory periods a week. Prerequisite, I. A. 152, and 154 or equivalent. Supervision and administrative policies; personnel management with emphasis on human relations, and philosophy underlying management practices.

# TEXTILES AND CLOTHING

*Professor:* MITCHELL.

*Assistant Professors:* HEAGNEY, WILBUR.

*Instructor:* SAMPSON, YOUNG.

*Lecturer:* SCHLUSSEL.

## T. & C. 5. TEXTILES AND CLOTHING IN CONTEMPORARY LIVING. (3)

First and second semesters. Laboratory fee, \$5.00. Three lecture-discussion periods a week. Comparative analysis of the significance of fashions and fabrics to individuals and groups, in terms of their physical, psychological, and social needs. Application of current technology to the choice and use of apparel and home furnishing textiles toward increasing satisfactions in changing modes of living.

### *For Advanced Undergraduates and Graduates*

## T. & C. 101. FASHION PROMOTION AND COORDINATION. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisites, T. & C. 126; Speech 115 or 117. Laboratory fee, \$3.00. Analysis of fashion media; industry publications, magazines, newspapers, radio, TV; merchandise displays and fashion shows. Role of the stylist.

## T. & C. 110. FIELD EXPERIENCE IN TEXTILES AND CLOTHING. (3)

First semester or summer school. Prerequisite, senior standing in department. Supervised and coordinated training-work program in cooperation with agencies and organizations.

## T. & C. 126. FUNDAMENTALS OF FASHION. (3)

Second semester. Prerequisite, Clo. 120. Laboratory fee, \$3.00. Fashion history; current fashions, how to interpret and evaluate them; fashion show techniques; fashion promotion. The course includes oral and written reports, group projects, panel discussions and field trips.

## T. & C. 128. FUNDAMENTALS OF HOME FURNISHINGS. (3)

First and second semesters. Three laboratory periods a week. Prerequisites, T. & C. 5, Clo. 10, or consent of instructor. Laboratory fee, \$3.00. Selection of fabrics for home and institutional furnishings; care and repair of such furnishings; custom construction of slip covers, draperies, bedspreads; refinishing and upholstering furniture.

## TEXTILES

## TEX. 50. CONSUMER TEXTILES. (3)

Second semester. Two lectures and one laboratory period a week. Prerequisite, T. & C. 5 or consent of instructor. Laboratory fee, \$3.00. (Cannot be used as

## TEXTILES AND CLOTHING

prerequisite for Tex. 150.) Problems of the consumer in textile selection, purchase, and care as related to service and esthetic features of fibers, yarns, and fabric construction and finish.

### TEX. 55. ELEMENTS OF TEXTILES. (3)

First semester. Two lectures and one laboratory period a week. Prerequisite, T. & C. 5, Chem. 11, 13 or 1, 3. Laboratory fee, \$3.00. Intensive study of the physical and chemical properties of fibers, of yarn and fabric construction, of color and design application, and of finishing. Evaluation of sources of consumer information on legislation protecting textile consumers. Economic factors affecting textile consumption.

#### *For Advanced Undergraduates and Graduates*

### TEX. 102. TEXTILE TESTING. (3)

Second semester. Three laboratory periods a week. Prerequisite, Tex. 150. Laboratory fee, \$3.00. The theory of textile testing methods, the repeated use of physical and chemical testing, interpretation of the data, and presentation of the findings.

### TEX. 150. ADVANCED TEXTILES. (3)

First semester. One lecture and two laboratory periods a week. Prerequisite, Tex. 55. Laboratory fee, \$3.00. An intensive study of textiles from the fiber to the finished fabric, from the producer to the consumer. Analysis of fabric construction and serviceability features.

### TEX. 153. INTERNATIONAL TEXTILES. (2)

First semester. Two lectures a week. Laboratory fee, \$3.00. Prerequisite, T. & C. 5 or consent of instructor. Study of historic and contemporary fibers and laces with analysis of designs and techniques of decorating fabrics; relationship of textiles to the esthetic and developmental cultures of society.

## CLOTHING

### CLO. 10. PRINCIPLES AND METHODS OF CLOTHING DESIGN. (2)

First and second semesters. Two lecture periods a week. Laboratory fee, \$10.00. Basic construction and fitting techniques of apparel demonstrated in relation to interpretation and use of commercial patterns. Esthetic and economic aspects as interrelated.

### CLO. 11. EXPERIMENTAL CLOTHING DESIGN (2)

First and second semesters. Two laboratory periods a week. Prerequisite, Clo. 10 or concurrent registration. Laboratory fee, \$3.00. Application of principles and methods of clothing construction with emphasis on management and analysis of values to be achieved.

### CLO. 21. PATTERN DESIGN. (3)

First and second semesters. Three two-hour laboratory periods a week. Prerequisites, Clo. 10 and consent of department. Laboratory fee, \$3.00. Pattern study, figure analysis and pattern alteration, development and adaptation of individual basic pattern, creation of original designs.

## TEXTILES AND CLOTHING

### *For Advanced Undergraduates and Graduates*

#### CLO. 100. FAMILY CLOTHING. (3)

First semester in alternate years. One lecture and two laboratory periods a week. Prerequisites, T. & C. 5; Clo. 10, 11; or equivalent. Laboratory fee, \$3.00. Clothing the family; analysis of needs of family members in various stages of the life cycle; individual and family budgets; problems in selection and/or construction of wardrobe items.

#### CLO. 120. DRAPING. (3)

First semester. Two laboratory periods a week. Prerequisite, Clo. 10, and Clo. 21. Laboratory fee, \$3.00. Demonstrations and practice in creating costumes in fabrics and on individual dress forms; modeling of garments for class criticism.

#### CLO. 122. TAILORING. (2)

First and second semesters. Two laboratory periods a week. Prerequisite, Clo. 21. Laboratory fee, \$3.00. Construction of tailored garments requiring professional skill.

#### CLO. 127. APPAREL DESIGN. (3)

Second semester. One lecture and two laboratory periods a week. Prerequisite, Clo. 120. Laboratory fee, \$3.00. The art of costuming; trade and custom methods of clothing design and construction; advanced work in draping, pattern design and/or tailoring, with study of the interrelationship of these techniques.

### *For Graduates*

#### TEX. 200. SPECIAL STUDIES IN TEXTILES. (2-4)

First or second semester. Summer session. Laboratory fee, \$3.00. Advanced inquiry into uses, care, types and/or performance of textile materials, either contemporary or historic depending on interest of students; compilation of data through testing, surveys, museum visits and/or field trips; writing of technical reports.

#### CLO. 220. SPECIAL STUDIES IN CLOTHING. (2-4)

First and second semester. Laboratory fee, \$3.00. Special areas of clothing are selected according to interest of student; consumer, design, functional aspects, and/or evaluation and analysis studies are made of those areas. Reports may be written, oral, or by group presentation.

#### T. & C. 230. SEMINAR. (1)

First and second semesters. Laboratory fee, \$3.00. The breadth and limit of the field of textiles and clothing are investigated; annotated bibliography is developed; one oral report is presented.

#### T. & C. 232. ECONOMICS OF TEXTILES AND CLOTHING. (3)

Second semester. Laboratory fee, \$3.00. Study of interrelationship of developments in production, distribution and consumption of textiles and clothing affecting consumers and the market. Analysis of consumption trends as related to patterns of family living and population changes.

## HOME ECONOMICS EDUCATION

### T. & C. 233. SYNTHESSES OF BEHAVIORAL SCIENCE CONCEPTS IN TEXTILES AND CLOTHING. (3)

Second semester. Prerequisites, Psych. 21 and/or consent of department. Analysis and interpretation of interdisciplinary research methods and findings with reference to behavioral aspects of textiles and clothing. Consideration given to measurement and relation of clothing interest and behavior to attitudes, values, roles, and social status groupings.

### T. & C. 399. RESEARCH. (1-6)

First and second semesters. Laboratory fee, \$3.00. A research problem is selected by the student; thesis for partial fulfillment of the Master of Science degree is written.

## HOME ECONOMICS EDUCATION<sup>40</sup>

### H. E. ED. 102. PROBLEMS IN TEACHING HOME ECONOMICS. (3)

First and second semesters. Prerequisite, H. E. Ed. 140. A study of the managerial aspects of teaching and administering a homemaking program; the physical environment, organization and sequence of instructional units; resource materials; evaluation; home projects.

### H. E. ED. 120. EVALUATION OF HOME ECONOMICS. (3)

The meaning and function of evaluation in education; the development of a plan for evaluating a homemaking program with emphasis upon types of evaluation devices, their construction and use.

### H. E. ED. 140. CURRICULUM, INSTRUCTION, AND OBSERVATION. (3)

The place and function of home economics education in the secondary school curriculum. Philosophy of education for home and family living; characteristics of adolescence, construction of source units, lesson plans, and evaluation devices; directed observations in junior and senior high school home economics departments.

### H. E. ED. 148. TEACHING VOCATIONAL HOME ECONOMICS IN THE SECONDARY SCHOOLS. (8)

First and second semesters. Prerequisite, H. E. Ed. 140 and 102 parallel. See Ed. 148 for additional requirements. Fee, \$24 for students who do not pay the regular instructional materials fee. Observation and supervised teaching in approved secondary school home economics departments in Maryland and the District of Columbia.

---

<sup>40</sup>For further information see College of Education catalog.

## HOME ECONOMICS EDUCATION

### *For Graduates*

H. E. ED. 200 SEMINAR IN HOME ECONOMICS EDUCATION. (2)

H. E. ED. 202. TRENDS IN THE TEACHING AND SUPERVISION OF HOME ECONOMICS. (2-4)

Study of home economics programs and practices in light of current educational trends. Interpretation and analysis of democratic teaching procedures, outcomes of instruction, and supervisory practices.

## GENERAL HOME ECONOMICS

*Professor:* CHAPMAN.

*Associate Professors:* LEMMON, WILSON

*Lecturer:* KINCAID.

H. E. 5. INTRODUCTION TO FAMILY LIVING THROUGH HOME ECONOMICS. (2)

First and second semesters. Responsibilities of the home economist to examine and understand interrelations of the individual and his family through the various stages of the family life cycle; underlying principles of guidance of children as applied to home situations; and scope of professional field of home economics in service to homes and families.

H. E. 10. SOCIAL USAGE. (1)

First and second semesters. One lecture and one-hour laboratory. Laboratory fee \$1.00. Analysis of social usage in furthering effective relationships at home and abroad.

### *For Advanced Undergraduates and Graduates*

H. E. 170. COMMUNICATION SKILLS AND TECHNIQUES IN HOME ECONOMICS. (3)

First and second semesters. Laboratory fee, \$10.00. Principles and techniques for professional demonstration and presentation of home economics and its related areas with selected experiences in television, radio, creative writing, and photography.

H. E. 180. PROFESSIONAL SEMINAR. (2)

First and second semesters. Clarification of perceptions of one's job and the situation in which one operates, attainment of professional breadth and depth, establishment of reasonable levels of aspiration—recognized to be requisites for a successful career in home economics and related areas. (For seniors in College of Home Economics.)

## FAMILY LIFE AND MANAGEMENT

### H. E. 190. SPECIAL PROBLEMS IN HOME ECONOMICS. (1-3)

First and second semesters. Consent of instructor. Laboratory fee, \$3.00 a semester hour. Problem may be in any area of home economics and will carry the name of the subject matter of the problem. a. Applied (Art) Design; b. Clothing; c. General Home Economics; d. Family Life; e. Food and Institutional Food; f. Management; g. Nutrition; h. Textiles.

#### *For Graduates*

### H. E. 201. METHODS OF RESEARCH IN HOME ECONOMICS. (3)

First and second semesters. Prerequisite, Statistics or Tests and Measurements. Application of scientific methods to problems in the field of home economics with emphasis on needed research of an inter-disciplinary nature.

### H. E. 202. INTEGRATIVE ASPECTS OF HOME ECONOMICS. (2)

First and second semesters. Prerequisite, consent of instructor. Scope and focus of total professional field with emphasis on purpose and functions as related to family and other group living. Impact of the changing social, economic, technological and educational situation upon home economics.

### H. E. 290. SPECIAL TOPICS. (1-6)

First and second semesters. Summer session. Concentrated study in areas of home economics, such as: consumer problems; housing, interior design and home furnishings; institution administration and food service. a. Applied (Art) Design; b. Clothing; c. General Home Economics; d. Family Life; e. Food and Institutional Food; f. Management; g. Nutrition; h. Textiles.

### H. E. 399. THESIS RESEARCH. (1-6)

First and second semesters. Summer session. Credit according to work accomplished.

## FAMILY LIFE AND MANAGEMENT

*Associate Professor:* REIBER.

*Assistant Professor:* ORVEDAL.

*Instructor:* GREEN.

*Lecturer:* BRITTON.

## FAMILY LIFE

#### *For Advanced Undergraduates and Graduates*

### F. L. 130. HOME MANAGEMENT AND FAMILY LIFE. (3)

First and second semesters. Prerequisites, Psych. 1; H. E. 5. Study of factors influencing establishment and maintenance of satisfying interpersonal relations throughout the family life cycle as affected by management in the home.

## FAMILY LIFE AND MANAGEMENT

### F. L. 132. THE CHILD IN THE FAMILY. (3)

First and second semesters. Three lectures. Prerequisite, Psych. I; H. E. 5; or equivalent. Study of the child from prenatal stage through adolescence, with emphasis on responsibility for guidance in the home. Biological and psychological needs as they affect the child's relationship with his family and peers.

### F. L. 135. DIRECTED EXPERIENCES WITH CHILDREN AND FAMILIES. (3)

First and second semesters. Laboratory fee, \$3.00. Prerequisites, Psych. 1 and consent of department. Observation and study of selected home situations placing emphasis on contemporary family living. This course is designed especially for students who wish an understanding of children of various ages in relation to the family and the quality of living achieved in a variety of life situations. (Limited to majors in the College of Home Economics.)

## HOME MANAGEMENT

### H. M. 50. DECISION MAKING IN FAMILY LIVING. (3)

First and second semesters. (Designed for second, third, or fourth semester students.) Decision making in relation to family values, philosophies, goals, and resources, and general socio-economic conditions.

### H. M. 80. FUNDAMENTALS OF HOUSEHOLD EQUIPMENT. (2)

First semester. Laboratory fee, \$3.00. Two lectures and one two-hour laboratory period a week. Prerequisite, consent of department. Principles basic to selection, use, and care of household equipment and appliances. Application to equipment used for refrigeration, food preparation, laundering, cleaning, and household wiring. Focus on management in relation to the family's equipment.

### *For Advanced Undergraduates and Graduates*

### H. M. 140. FUNDAMENTALS OF HOUSING. (3)

Second semester. Two lectures and one two-hour laboratory a week. Prerequisite, H. M. 50. Laboratory fee, \$3.00. Sociological, psychological and economic aspects of housing. Relationship of the house and the family living within.

### H. M. 160. SCIENTIFIC MANAGEMENT IN THE HOME. (3)

First and second semesters. Two lectures and one two-hour laboratory period a week. Prerequisite, H. M. 50 or equivalent. Laboratory fee, \$3.00. The philosophy and application of principles of scientific management in the home through the use of resources; management of time, energy, and money; work simplification.

### H. M. 161. RESIDENT EXPERIENCE IN HOME MANAGEMENT. (3)<sup>41</sup>

First and second semesters. Prerequisites, H. M. 50, 160; Food 150; or equivalent. Laboratory fee, \$10.00. Residence from five to nine weeks in the home management center. Experience in planning, coordinating, and participating in the activities of a household, composed of a faculty member, a group of students, and possibly an infant on a part-time basis. Students not living in

---

<sup>41</sup>Reservations for the Home Management Residence should be made at registration for the 5th or 6th semester. Forms may be obtained from the advisers.

## HOUSING, APPLIED DESIGN, AND CRAFTS

dormitories are billed at the rate of \$5.00 a week for a room in the Home Management Residence. A charge of \$40.00 for food and supplies is assured each student. Dormitory residents will be refunded a prorated amount for meals.

### H. M. 162. PERSONAL AND FAMILY FINANCE. (2)

First semester. Prerequisite, H. M. 50. Study of factors influencing use of money; how families attempt to achieve financial security; interrelationship of money and other resources; types of credit. Emphasis on management of the family's money.

### H. M. 165. HOME MANAGEMENT PRACTICUM. (3)

First and second semesters. Prerequisites, H. M. 50, 160; Food 150; or equivalent; consent of department. Laboratory fee, \$3.00. Home management experience under supervision in a variety of situations. Designed especially for students who are managing their own homes.

## HOUSING, APPLIED DESIGN AND CRAFTS

*Professor:* CURTISS.

*Associate Professor:* SHEARER

*Assistant Professors:* BECKWITH, ROPER.

*Instructors:* ODLAND, ROPKO, SELL, STEWART.

*Lecturer:* DAVIS.

A. D. 1, Design, must be taken prior to or concurrently with any other course offered by the Department.

The Department reserves the right to retain for illustrative purposes one art problem from each student in each class.

## HOUSING AND APPLIED (ART) DESIGN

### A. D. 1. DESIGN. (3)

First and second semesters. Fee, \$3.00. Art expression through materials such as opaque water color, wet clay, colored chalk, and lithograph crayon which are conducive to freeing techniques. Elementary lettering, action figures, abstract design, three-dimensional design and general composition study. Consideration of art as applied to daily living.

### A. D. 2. SURVEY OF ART HISTORY. (2)

First and second semesters. Fee, \$3.00. A rapid survey of art, from prehistoric times to the twentieth century, showing the great human movements and art ideals which each period has reflected. Emphasis is given to residential architecture, furniture, accessories and costume and to the philosophy and significance of art in today's living.

## HOUSING, APPLIED DESIGN, AND CRAFTS

### A. D. 3. SILK SCREEN PRINTING. (2)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Original design using the silk screen process for brochure covers, book jackets, greeting cards, posters, salon prints, and decorative textiles.

### A. D. 4. THREE-DIMENSIONAL DESIGN. (2)

First semester. Two laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Abstract design emphasizing form, volume, depth and movement. Exploratory use of materials to stimulate resourcefulness, imagination, and distinctive style.

### A. D. 20. COSTUME DESIGN. (3)

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, 2 or consent of instructor. Fee, \$3.00. Clothing selection and designing in relation to personality, coloring, figure, changing fashions, and occasion. Original design rendered in transparent and opaque water color, soft pencil, chalk and India ink. A minimum of basic fashion figure drawing. Survey of the fashion industry, contemporary style, and historic costume.

### A. D. 21, 22. ACTION DRAWING. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Study of the human figure with emphasis upon action, proportion, and balance. Development of techniques in soft pencil, lithograph pencil, chalk, transparent water color, and India ink.

### A. D. 23. HISTORY OF COSTUME. (2)

First and second semesters. Two lectures. A historical costume survey and intensive study of fashion cycles. Emphasis on styles adapted to contemporary period.

### A. D. 30. TYPOGRAPHY AND LETTERING. (3)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Practice in hand lettering and recognition of type faces with application to layouts for advertisements, books and magazines. Elementary knowledge of printing processes including an understanding of type sizes and weights, leading, and copy fitting. Readings.

### A. D. 38, 39. PHOTOGRAPHY. (2, 2)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Experimental effects with emphasis upon design in photography for advertising, display, periodicals, scientific recording and teaching. It is advisable for each student to have his own camera.

### H.A.D. 40. PROFESSIONAL ASPECTS OF INTERIOR DESIGN. (1)

One lecture period a week. Professional orientation to the field of interior design.

### H.A.D. 41. FUNDAMENTALS OF INTERIOR DESIGN. (3)

First and second semesters. One lecture and three laboratory periods a week. Prerequisites, A. D. 1 and 2. Fee, \$3.00. Analysis of interiors as backgrounds for various personalities. Study of good and poor interiors. Original floor plans and wall elevations drawn to scale, rendered in color and coordinated with fabrics. Consideration of family living.

## HOUSING, APPLIED DESIGN, AND CRAFTS

### H.A.D. 46. MATERIALS LABORATORY IN INTERIOR DECORATION. (2)

First or second semester. One lecture and one three-hour laboratory period. Laboratory fee, \$3.00. Prerequisites, H.A.D. 40, 41. Analysis of decorative furnishings and introduction to practices used by professional decorators or craftsmen in the decorative trades. Emphasis on materials of decoration, their use and limitations.

## CRAFTS

### CR. 2. SIMPLE CRAFTS. (2)

Second semester. Two laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Creative expression in clay modeling, paper or metal sculpture, plaster or wood carving, and finger weaving. Emphasis is given to inexpensive materials and tools and to techniques that can be pursued in the home or the informal recreation center.

### CR. 5. PUPPETRY. (3)

First semester, alternate years. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Making of marionettes and production of simple puppet shows. Valuable as a teaching, advertising, or recreational medium.

### CR. 20, 21. CERAMICS. (2, 2)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Elementary clay sculpture and pottery making stressing good design in form, decoration and glaze.

### CR. 30, 31. METALRY. (2, 2)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Etching, sawing, soldering, raising, and enameling using copper and sterling silver. Good, original design is stressed.

### CR. 40, 41. WEAVING. (2, 2)

First and second semesters. Three laboratory periods a week. Prerequisite, A. D. 1. Fee, \$3.00. Creative weaving on harness looms, inkle looms and cards. Emphasis is placed upon good texture, pattern and color with relation to the purpose of each textile.

### *For Advanced Undergraduates and Graduates*

## HOUSING AND APPLIED (ART) DESIGN

### H.A.D. 110. EXTERIOR-INTERIOR HOUSING DESIGN. (3)

First and second semesters. Two lectures and one two-hour laboratory period a week. Laboratory fee, \$6.00. Prerequisite, H.A.D. 41. An analysis of the works of contemporary architects and an overview of the field of architecture, relating the elements and principles to interiors.

### A. D. 100, 101. MURAL DESIGN. (2, 2)

First or second semester, alternate years. Three laboratory periods a week. Prerequisite, A. D. 1, 21. Fee, \$3.00. Group and individual expression serving two types of objectives; temporary murals for the public schools developed from classroom study and rendered in colored chalk on wrapping paper; murals for

## HOUSING, APPLIED DESIGN, AND CRAFTS

permanent architectural decoration considering propriety to setting and rendered in oil paint, gouache, fresco, or mosaic. Brief study of civilization's use of murals. Field trips to nearby murals having social significance.

### A. D. 120, 121. COSTUME ILLUSTRATION. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 2, 20, 21. Fee, \$3.00. Fashion rendering emphasizing clothing structure, representation of materials and development of individual rendering technique. Development of techniques employing transparent water color, India ink, Craftint, Zipatone and Burgess process. Study of styles of contemporary fashion illustrators.

### A. D. 124, 125. INDIVIDUAL PROBLEMS IN COSTUME. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 2, 20, 21, 120, 121. Fee, \$3.00. Advanced problems in fashion illustration or costume design for students who are capable of independent work. Program developed in consultation with the instructor.

### A. D. 132. ADVERTISING LAYOUT. (2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 20, 30. Fee, \$3.00. Designing of rough to finished layouts for advertisements for newspapers, magazines, packages, brochures and other forms of direct advertising. Included is the study of typography and illustration and their relationship to reproduction. Experience in use of the airbrush.

### A. D. 134, 135. INDIVIDUAL PROBLEMS IN ADVERTISING. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 20, 30, 132. Fee, \$3.00. Advanced problems in advertising layout. Opportunity to build skills in one or more areas of advertising design.

### A. D. 136. MERCHANDISE DISPLAY. (2)

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, 30. Fee, \$3.00. Practice in effective merchandise display in cooperation with retail establishments. Study of other aspects of display through field experience, discussion, and research.

### A. D. 138. ADVANCED PHOTOGRAPHY. (2)

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, 38, 39. Fee, \$3.00. Advanced experimental effects emphasizing design in photography. Each student must have his own camera.

### H.A.D. 142, 143. ADVANCED INTERIOR DESIGN. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 2, H.A.D. 41. Fee, \$3.00. Designing of rooms drawn in perspective and isometrics and rendered in water color. Coordination with fabrics, floor and wall finishes. Study of budgets, costs, and manufacturing techniques. Field experiences.

### H.A.D. 144, 145. INDIVIDUAL PROBLEMS IN INTERIOR. (2, 2)

First and second semesters. Two laboratory periods a week. Prerequisites, A. D. 1, 2, H.A.D. 41, 142, 143. Fee, \$3.00. Advanced problems in interior design for students who are capable of independent work. Students assume the role of interior decorator serving the needs of theoretical clients. Field experiences.

**CRAFTS****CR. 102. CREATIVE CRAFTS. (2-4)**

Summer session. Daily laboratory periods. Prerequisites, A. D. 1 and permission of the department. Fee, \$3.00. Interests of the persons enrolled will determine the crafts to be pursued. Suggested: block printing, wood burning, crayon decoration, paper sculpture, clay modeling, metalry, weaving. Excellent for teachers, directors of recreation centers, and persons who desire an introduction to recreational crafts.

**CR. 120, 121. ADVANCED CERAMICS. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 20, 21. Fee, \$3.00. Advanced techniques in clay sculptures and in building pottery on the potter's wheel. Study of glaze composition and calculation. Experimentation with several clay bodies.

**CR. 124, 125. INDIVIDUAL PROBLEMS IN CERAMICS. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 20, 21, 120, 121. Fee, \$3.00. Individual problems in clay sculpture and pottery making. Use of gas kiln fired in the medium cone range and experimental research in glazes and original textural effects.

**CR. 130, 131. ADVANCED METALRY. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 30, 31. Fee, \$3.00. Advanced application of basic techniques in metal working and jewelry making. Introduction of ring making, stone setting and metal casting.

**CR. 134, 135. INDIVIDUAL PROBLEMS IN METALRY. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 30, 31, 130, 131. Fee, \$3.00. Advanced problems in metalry and jewelry making. Supervised laboratory for students capable of independent work and research.

**CR. 140, 141. ADVANCED WEAVING. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 40. Fee, \$3.00. Advanced weaving on four and eight harness looms stressing creative weaves in relation to functional use.

**CR. 144, 145. INDIVIDUAL PROBLEMS IN WEAVING. (2, 2)**

First and second semesters. Three laboratory periods a week. Prerequisites, A. D. 1, Cr. 40, 41, 141. Fee, \$3.00. Advanced problems in creative weaving.



# THE FACULTY

## *Administrative Officers*

CHAPMAN, Erna R., Professor of Home Economics and Acting Dean of the College of Home Economics

B.S., University of Maryland, 1934; M.S., 1939.

## *Professors*

CURTISS, Vienna, Professor of Applied Design

Certificate, Parsons School of Design, 1930; B.A., Arizona State College, 1933; M.A., Columbia University, 1935; Ed.D., 1957.

MITCHELL, T. Faye, Professor and Head of Department of Textiles and Clothing

B.S., State Teachers College, Springfield, Missouri, 1930; M.A., Columbia University, 1939.

## *Associate Professors*

BRAUCHER, Pela F., Associate Professor of Food and Nutrition

A.B., Goucher College, 1927; M.S., Pennsylvania State University, 1929.

BROWN, Helen I., Associate Professor and Head of Department of Food, Nutrition and Institution Administration

B.S., University of Vermont, 1938; M.A., Columbia University, 1948; Ph.D., Michigan State University, 1960.

LEMMON, Louise, Associate Professor of Home Economics Education

B.S., Northern Illinois University, 1946; M.S., University of Wisconsin, 1951; Ed.D., University of Illinois, 1961.

REIBER, Stanley R., Lecturer in Family Life

B.S., Grove City College, 1942; B.D., Yale University, 1945; M.S., Florida State University, 1960; Ph.D., 1965.

SHEARER, Jane K., Associate Professor and Head of Housing and Applied Design

B.S., University of Tennessee, 1940; M.S., 1950; Ph.D., Florida State University, 1960.

WILSON, Leda A., Associate Professor of Home Economics

B.S., Lander College, 1943; M.S., University of Tennessee, 1950; Ed.D., 1954.

## *Assistant Professors*

BANGS, Sybil, Assistant Professor of Institution Administration

B.S., Kansas State University, 1943; M.S., 1960.

BECKWITH, Cornelia L., Assistant Professor of Applied Design

Ph.B., University of Chicago, 1929; M.A., Columbia University, 1937.

COLLINS, Elisabeth N., Assistant Professor of Nutrition

B.A., Pembroke College, 1921; M.A., Simmons College, 1947.

EHEART, Mary S., Assistant Professor of Food and Nutrition

A.B., Park College, 1933; A.M., University of Chicago, 1935.

HEAGNEY, Eileen M., Assistant Professor of Textiles and Clothing

B.S., Pennsylvania State University, 1941; M.A., Columbia University, 1949.

ORVEDAL, Ruth W., Assistant Professor of Home Management

B.S., Middle Tennessee State College, 1937; M.S., University of Tennessee, 1941.

## FACULTY

ROPER, James B., Assistant Professor of Applied Design  
B.S., East Carolina College, 1961; M.A., 1963.

WILBUR, June C., Assistant Professor of Textiles and Clothing  
B.S., University of Washington, 1936; M.S., Syracuse University, 1940.

### *Instructors*

GREEN, Kinsey B., Instructor in Home Management  
B.S., Mary Washington College, 1960; M.S., University of Maryland, 1965.

HARWOOD, Velma, Instructor in Food and Nutrition  
B.S., University of Illinois, 1935; M.S., University of Maryland, 1965.

KNIGHTON, Ruth, Instructor in Food and Nutrition  
B.S., University of Massachusetts, 1961; M.S., University of Maryland, 1965.

LANZ, Sally J., Instructor in Food and Nutrition  
B.S., Albright College, 1956; M.S., Pennsylvania State University, 1960.

McKINLEY, Margaret, Instructor in Food and Nutrition  
B.S., Hood College, 1938; M.S., Columbia University, 1947.

ODLAND, Sheldon, Instructor in Housing and Applied Design  
B.S., Pennsylvania State University, 1957.

ROPKO, Elaine  
B.A., Holy Family College, 1958; M.F.A., Catholic University, 1961.

SAMPSON, Sandra  
B.A., Arizona State University, 1962; M.S., Oregon State University, 1965.

SELL, Geneieve L.  
B.S., University of Wisconsin, 1941; M.S., 1960.

STEWART, Karen K., Instructor in Housing and Applied Design  
B.S., Oklahoma State University, 1963; M.S., 1964.

YOUNG, Eleanor F., Instructor in Textiles and Clothing  
B.S., University of Maryland, 1955; M.S., 1958.

### *Lecturers*

BRITTON, Virginia, Lecturer in Family Economics  
Ph.D., University of Chicago.

DAVIS, Fremont, Lecturer in Applied Design

KINCAID, Virginia, Lecturer in Home Economics  
B.S., Madison College, 1925; M.A., Virginia Polytechnic Institute, 1941.

SCHLUSSEL, Rosanne  
B.A., Queens College, 1961.

STERLING, Mabel K., Lecturer in Food and Nutrition  
B.S., University of Maryland, 1947; M.S., 1963.

### *Research Assistants*

DAWSON, Virginia T.  
B.A., Ohio State University, 1937; M.S., University of Maryland, 1939.

## FACULTY

### *Graduate Assistants*

ADAMS, Yvonne

B.S., University of Maryland, 1965.

DAVIS, Carole

B.S., Madison College, 1961.

KLIOT, Rochelle

B.S., Brooklyn College, 1964.

LANGFELDT, Gladys

B.S., State College of Iowa, 1933.

MATTHEWS, Linda M.

B.S., University of North Carolina, 1962.

MADDEN, Elizabeth

B.S., Purdue University, 1937.

STILES, Louise

B.S., Georgia State College, 1929.

VERMETTE, Joan

B.S., Florida Southern College, 1960.

WALKER, Sharon

University of Maryland, 1964.



*CATALOG OF THE*  
COLLEGE OF  
PHYSICAL  
EDUCATION,  
RECREATION  
AND HEALTH  
1966-68

THE  
UNIVERSITY  
OF  
MARYLAND

*Volume 22*

*March 2, 1966*

*Number 18*

UNIVERSITY OF MARYLAND BULLETIN is published four times in September; three times in January, March and May; and two times in August, October, November, December, February, April, June and July. Published twenty-nine times. Re-entered as second class mail matter under the Act of Congress on August 24, 1912, and second class postage paid at College Park, Maryland.



# Contents

## GENERAL

University Calendar .....	v	Undergraduate Professional	
Board of Regents .....	vi	Curricula .....	7
Officers of Administration .....	vii	Guidance .....	7
Chairmen, Faculty Senate .....	xi	Normal Load .....	7
The College .....	1	Electives .....	7
Facilities .....	1	Transfer Students .....	7
Cultural and Recreational		Freshman and Sophomore	
Opportunities .....	3	Programs .....	8
General Information .....	4	Junior Status .....	8
Expenses .....	5	Student Teaching .....	8
Air Science Instruction .....	6	Degrees .....	9
		Certification .....	9

## PROFESSIONAL CURRICULA

Physical Education .....	10	Health Education .....	24
Dance .....	16	Minors in Other Areas .....	26
Recreation .....	19	Physical Therapy .....	28

## GRADUATE STUDY

Special Study .....	31	General Advanced Study .....	33
General Regulations .....	31	Prerequisites for Advanced	
Master of Arts Degree .....	32	Study .....	33
Doctor of Education .....	32	Graduate Assistantships .....	34
Doctor of Philosophy Degree .....	33		

## COURSE OFFERINGS

Physical Education .....	35	Non-Major Program .....	56
Recreation .....	42	The Program for Men .....	56
Health Education .....	46	The Program for Women .....	57
Physical Therapy .....	51	Required Health Education	
		for Women .....	57
Student Organizations Sponsored by the College .....			58
Faculty of the College .....			61



# University Calendar, 1966-67

(TENTATIVE)

## *FALL SEMESTER, 1966*

### SEPTEMBER

- 12-16 Monday-Friday—Fall Semester Registration
- 19 Monday—Instruction begins

### NOVEMBER

- 23 Wednesday, after last class—Thanksgiving recess begins
- 28 Monday, 8:00 A. M.—Thanksgiving recess ends

### DECEMBER

- 21 Wednesday, after last class—Christmas recess begins

### JANUARY

- 3 Tuesday, 8:00 A. M.—Christmas recess ends
- 16 Monday—Pre-exam Study Day
- 17-24 Tuesday-Tuesday—Fall Semester Examinations

## *SPRING SEMESTER, 1967*

### JANUARY

- 30-Feb. 3 Monday-Friday—Spring Semester Registration

### FEBRUARY

- 6 Monday—Instruction begins
- 22 Wednesday—Washington's Birthday, holiday

### MARCH

- 23 Thursday, after last class—Easter recess begins
- 28 Tuesday, 8:00 A. M.—Easter recess ends

### MAY

- 10 Wednesday—AFROTC Day
- 24 Wednesday—Pre-exam Study Day
- 25-June 2 Thursday-Friday—Spring Semester Examinations
- 30 Tuesday—Memorial Day, holiday

### JUNE

- 3 Saturday—Commencement Exercises

## *SUMMER SESSION, 1967*

### JUNE

- 26-27 Monday-Tuesday—Registration, Summer Session
- 28 Wednesday—Instruction begins

### JULY

- 4 Tuesday—Independence Day, holiday
- 8 Saturday—Classes (Tuesday schedule)

### AUGUST

- 18 Friday—Summer Session Ends

## *SHORT COURSES, SUMMER, 1967*

### JUNE

- 12-17 Monday-Saturday—Rural Women's Short Course

### AUGUST

- 7-11 Monday-Friday—4-H Club Week

### SEPTEMBER

- 5-8 Tuesday-Friday—Firemen's Short Course

# Board of Regents and Maryland State Board of Agriculture

## CHAIRMAN

CHARLES P. MCCORMICK

*McCormick and Company, Inc., 414 Light Street, Baltimore, 21202*

## VICE-CHAIRMAN

EDWARD F. HOLTER

*Farmers Home Administration, Room 412 Hartwick Bldg.,  
4321 Hartwick Road, College Park, 20740*

## SECRETARY

B. HERBERT BROWN

*The Baltimore Institute, 10 West Chase Street, Baltimore, 21201*

## TREASURER

HARRY H. NUTTLE

*Denton, 21629*

## ASSISTANT SECRETARY

LOUIS L. KAPLAN

*The Baltimore Hebrew College, 5800 Park Heights Ave., Baltimore, 21215*

## ASSISTANT TREASURER

RICHARD W. CASE

*Smith, Somerville and Case, 1 Charles Center—17th Floor,  
Baltimore, 21201*

HON. MARY ARABIAN

*Municipal Court of Baltimore City, Baltimore 21201*

DR. WILLIAM B. LONG

*Medical Center, Salisbury, 21801*

THOMAS W. PANGBORN

*The Pangborn Corporation, Pangborn Blvd., Hagerstown, 21740*

THOMAS B. SYMONS

*7410 Columbia Ave., College Park, 20740*

WILLIAM C. WALSH

*Liberty Trust Building, Cumberland, 21501*

# Officers Of The University

## *Central Administrative Officers*

### PRESIDENT

Wilson H. Elkins—*B.A., University of Texas, 1932; M.A., 1932; B.Litt., Oxford University, 1936; D.Phil., 1936.*

### VICE PRESIDENT, BALTIMORE CAMPUSES

Albin O. Kuhn—*B.S., University of Maryland, 1938; M.S., 1939; Ph.D., 1948.*

### VICE PRESIDENT FOR ACADEMIC AFFAIRS

R. Lee Hornbake—*B.S., California State College, Pennsylvania, 1934; M.A., Ohio State University, 1936; Ph.D., 1942.*

### VICE PRESIDENT FOR ADMINISTRATIVE AFFAIRS

Walter B. Waetjen—*B.S., Millersville State College, Millersville, Pennsylvania, 1942; M.S., University of Pennsylvania, 1947; Ed.D., University of Maryland, 1951.*

### ASSISTANT TO THE PRESIDENT

Frank L. Bentz, Jr.—*B.S., University of Maryland, 1942; Ph.D., 1952.*

### ASSISTANT TO THE PRESIDENT FOR UNIVERSITY RELATIONS

Robert A. Beach, Jr., *A.B., Baldwin-Wallace College, 1950; M.S., Boston University, 1954.*

### ASSISTANT, PRESIDENT'S OFFICE, RESEARCH

Justin Williams—*A.B., State Teachers College, Conway, Arkansas, 1926; M.A., State University of Iowa, 1928; Ph.D., 1933.*

### ASSISTANT, PRESIDENT'S OFFICE

Robert E. Kendig—*A.B., College of William and Mary, 1939; M.A., George Washington University, 1965.*

### DIRECTOR OF FINANCE AND BUSINESS

C. Wilbur Cissel—*B.A., University of Maryland, 1932; M.A., C.P.A., 1939.*

### ASSISTANT DIRECTOR OF FINANCE AND BUSINESS

James T. Frye—*B.S., University of Georgia, 1948; M.S., 1952.*

### COMPTROLLER AND BUDGET OFFICER

Harry D. Fisher—*B.S., University of Maryland, 1943; C.P.A., 1948.*

### DIRECTOR OF ADMISSIONS AND REGISTRATIONS

G. Watson Algire—*B.A., University of Maryland, 1930; M.S., 1931.*

### ASSOCIATE DIRECTOR AND REGISTRAR

James P. Hill—*B.S., Temple University, 1939; Ed.M., 1947; Ed.D., University of Michigan, 1963.*

### DIRECTOR OF ALUMNI AFFAIRS

J. Logan Schultz—*B.S., University of Maryland, 1938; M.S., 1940.*

## DIRECTOR OF ATHLETICS

William W. Cobey—*A.B., University of Maryland, 1930.*

## DIRECTOR OF PERSONNEL

George W. Fogg—*B.A., University of Maryland, 1926; M.A., 1928.*

## ASSISTANT DIRECTOR OF PERSONNEL

James D. Morgan—*B.S., University of Maryland, 1949; M.B.A., 1950.*

## DIRECTOR AND SUPERVISING ENGINEER, DEPARTMENT OF PHYSICAL PLANT

George O. Weber—*B.S., University of Maryland, 1933.*

## ASSOCIATE DIRECTOR AND SUPERVISING ENGINEER, PHYSICAL PLANT (Baltimore)

George W. Morrison—*B.S., University of Maryland, 1927; E.E., 1931.*

## *Emeriti*

### PRESIDENT EMERITUS

Harry C. Byrd—*B.S., University of Maryland, 1908; LL.D., Washington College, 1936; LL.D., Dickinson College, 1938; D.Sc., Western Maryland College, 1938.*

### DEAN OF WOMEN EMERITA

Adele H. Stamp—*B.A., Tulane University, 1921; M.A., University of Maryland, 1924.*

### DEAN OF MEN EMERITUS

Geary F. Eppley—*B.S., University of Maryland, 1920; M.S., 1926.*

## *Deans of the Schools and Colleges*

### DEAN OF AGRICULTURE

Gordon M. Cairns—*B.S., Cornell University, 1936; M.S., 1938; Ph.D. 1940.*

### DEAN OF THE COLLEGE OF ARTS AND SCIENCES

Charles Manning—*B.S., Tufts College, 1929; M.A., Harvard University, 1931; Ph.D., University of North Carolina, 1950.*

### DEAN OF THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Donald W. O'Connell—*B.A., Columbia University, 1937; M.A., 1938; Ph.D., 1953.*

### DEAN OF THE SCHOOL OF DENTISTRY

John J. Salley—*D.D.S., Medical College of Virginia, 1951; Ph.D., University of Rochester School of Medicine and Dentistry, 1954.*

### DEAN OF THE COLLEGE OF EDUCATION

Vernon E. Anderson—*B.S., University of Minnesota, 1930; M.A., 1936; Ph.D., University of Colorado, 1942.*

### DEAN OF THE COLLEGE OF ENGINEERING

Robert B. Beckmann—*B.S., University of Illinois, 1940; Ph.D., University of Wisconsin, 1944.*

DEAN OF FACULTY—UNIVERSITY OF MARYLAND, BALTIMORE COUNTY  
Homer W. Schamp, Jr.—*A.B., Miami University, 1944; M.Sc., University of Michigan, 1947; Ph.D., 1952.*

#### DEAN OF THE GRADUATE SCHOOL

Ronald Bamford—*B.S., University of Connecticut, 1924; M.S., University of Vermont, 1926; Ph.D., Columbia University, 1931.*

#### ACTING DEAN OF THE COLLEGE OF HOME ECONOMICS

Erna Chapman—*B.S., University of Maryland, 1934; M.S., University of Maryland, 1936.*

#### DEAN OF THE SCHOOL OF LAW

William P. Cunningham—*A.B., Harvard College, 1944; LL.B., Harvard Law School, 1948.*

#### DEAN OF THE SCHOOL OF LIBRARY AND INFORMATION SERVICES

Paul Wasserman—*B.B.A., College of the City of New York, 1948; M.S. (L.S.), Columbia University, 1949; M.S. (Economics) Columbia University, 1950; Ph.D., University of Michigan, 1960.*

#### DEAN OF THE SCHOOL OF MEDICINE AND DIRECTOR OF MEDICAL EDUCATION AND RESEARCH

William S. Stone—*B.S., University of Idaho, 1924; M.S., 1925; M.D., University of Louisville, 1929; Ph.D., (Hon.), University of Louisville, 1946.*

#### DEAN OF THE SCHOOL OF NURSING

Marion Murphy—*B.S., University of Minnesota, 1936; M.P.H., University of Michigan, 1946; Ph.D., 1959.*

#### DEAN OF THE SCHOOL OF PHARMACY

Noel E. Foss—*Ph.C., South Dakota State College, 1929; B.S., 1929; M.S., University of Maryland, 1932; Ph.D., 1933.*

#### DEAN OF THE COLLEGE OF PHYSICAL EDUCATION, RECREATION AND HEALTH

Lester M. Fraley—*B.A., Randolph-Macon College, 1928; M.A., 1937; Ph.D., Peabody College, 1939.*

#### DEAN OF THE SCHOOL OF SOCIAL WORK

Verl S. Lewis—*A.B., Huron College, 1933; M.A., University of Chicago, 1939; D.S.W., Western Reserve University, 1954.*

#### DEAN OF UNIVERSITY COLLEGE

Ray W. Ehrensberger—*B.A., Wabash College, 1929; M.A., Butler University, 1930; Ph.D., Syracuse University, 1937.*

### *Directors of Educational Services and Programs*

#### EXECUTIVE DEAN FOR STUDENT LIFE

Leslie R. Bundgaard—*B.S., University of Wisconsin, 1948; M.S., 1949; Ph.D., Georgetown University, 1954.*

#### DEAN OF WOMEN

Helen E. Clarke—*B.S., University of Michigan, 1943; M.A., University of Illinois, 1951; Ed.D., Teachers College, Columbia University, 1960.*

#### DIRECTOR, AGRICULTURAL EXTENSION SERVICE

Edward W. Aiton—*B.S., University of Minnesota, 1933; M.S., 1940; Ed.D., University of Maryland, 1956.*

#### DIRECTOR, AGRICULTURE EXPERIMENT STATION

Irvin C. Haut—*B.S., University of Idaho, 1928; M.S., State College of Washington, 1930; Ph.D., University of Maryland, 1933.*

#### DIRECTOR, COMPUTER SCIENCE CENTER

William F. Atchison—*A.B., Georgetown College, 1938; M.A., University of Kentucky, 1940; Ph.D., University of Illinois, 1943.*

#### DIRECTOR, COUNSELING CENTER

Thomas Magoon—*B.A., Dartmouth, 1947; M.A., University of Minnesota, 1951; Ph.D., 1954.*

#### DIRECTOR, GENERAL EDUCATION PROGRAM

Gayle S. Smith—*B.S., Iowa State College, 1948; M. A., Cornell University, 1951; Ph.D., 1958.*

#### DIRECTOR, INSTITUTIONAL RESEARCH

Robert E. McClintock—*B.S., University of South Carolina, 1951; M.A., George Peabody College, 1952; Ph.D., 1961.*

#### DIRECTOR OF LIBRARIES

Howard Rovelstad—*B.A., University of Illinois, 1936; M.A., 1937; B.S.L.S., Columbia University, 1940.*

#### DIRECTOR OF NATURAL RESOURCES INSTITUTE

L. Eugene Cronin—*A.B., Western Maryland College, 1938; M.S., University of Maryland, 1943; Ph.D., 1946.*

#### DIRECTOR OF PROFESSIONAL AND SUPPORTING SERVICES, UNIVERSITY HOSPITAL

George H. Yeager—*B.S., University of West Virginia, 1925; M.D., University of Maryland, 1929.*

#### DIRECTOR OF STUDENT HEALTH SERVICE

Lester M. Dyke—*B.S., University of Iowa, 1936; M.D., 1926.*

#### DIRECTOR OF THE SUMMER SESSION

Clodus R. Smith—*B.S., Oklahoma State University, 1950; M.S., 1955; Ed.D., Cornell University, 1960.*

#### HEAD, DEPARTMENT OF AIR SCIENCE

Vernon H. Reeves—*B.A., Arizona State College, 1936; M.A., Columbia University, 1949.*

#### *Division Chairmen*

#### CHAIRMAN OF THE DIVISION OF BIOLOGICAL SCIENCES

John E. Faber—*B.S., University of Maryland, 1926; M.S., 1927; Ph.D., 1937.*

#### CHAIRMAN OF THE LOWER DIVISION

Charles E. White—*B.S., University of Maryland, 1923; M.S., 1924; Ph.D., 1926.*

#### CHAIRMAN OF THE DIVISION OF SOCIAL SCIENCES

Harold C. Hoffsommer—*B.S., Northwestern University, 1921; M.A., 1923; Ph.D., Cornell University, 1929.*

## STANDING COMMITTEES, FACULTY SENATE

GENERAL COMMITTEE ON EDUCATIONAL POLICY  
GENERAL COMMITTEE ON STUDENT LIFE AND WELFARE  
COMMITTEE ON ADMISSIONS AND SCHOLASTIC STANDING  
COMMITTEE ON INSTRUCTIONAL PROCEDURES  
COMMITTEE ON SCHEDULING AND REGISTRATION  
COMMITTEE ON PROGRAMS, CURRICULA AND COURSES  
COMMITTEE ON FACULTY RESEARCH  
COMMITTEE ON PUBLIC FUNCTIONS AND COMMENCEMENTS  
COMMITTEE ON LIBRARIES  
COMMITTEE ON UNIVERSITY PUBLICATIONS  
COMMITTEE ON INTERCOLLEGIATE COMPETITION  
COMMITTEE ON PROFESSIONAL ETHICS, ACADEMIC FREEDOM  
AND TENURE  
COMMITTEE ON APPOINTMENTS, PROMOTIONS AND SALARIES  
COMMITTEE ON FACULTY LIFE AND WELFARE  
COMMITTEE ON MEMBERSHIP AND REPRESENTATION  
COMMITTEE ON COUNSELING OF STUDENTS  
COMMITTEE ON THE FUTURE OF THE UNIVERSITY

### *Adjunct Committees of the General Committee on Student Life and Welfare*

STUDENT ACTIVITIES  
FINANCIAL AIDS AND SELF-HELP  
STUDENT PUBLICATIONS AND COMMUNICATIONS  
RELIGIOUS LIFE  
STUDENT HEALTH AND SAFETY  
STUDENT DISCIPLINE  
BALTIMORE CAMPUS, STUDENT AFFAIRS



# The College

THE COLLEGE OF PHYSICAL EDUCATION, RECREATION, AND HEALTH PROVIDES preparation leading to the Bachelor of Science degree in the following professional areas: physical education, dance, health education, recreation, and physical therapy. The College also offers special curricula in safety education and elementary physical education. Moreover, in conjunction with the Graduate School and the College of Education, graduate programs leading to the master's and doctor's degrees are available in physical education, health education and recreation. The college provides a research laboratory for faculty members and graduate students who are interested in investigating the effects of exercise and various physical education activities upon the body, as well as determining methods and techniques of teaching various sports.

A one year required program of physical education and a one semester required health education program is provided by this College for all freshmen men and women of the University. The College provides an extensive intramural sports program for both men and women.

In addition to its various on-campus offerings, this College regularly conducts courses in physical education, health education and recreation for teachers in various parts of the State of Maryland and conducts workshops for teachers wherever requested by school officials.

## *Facilities*

The facilities of the College are unusual for a University of this size. Four separate buildings are used for the Women's Department, the Intramural Department, the Required Program for Men, and the Physical Education Teacher Education Program. There is also ample outdoor play space. Some of the facilities are shared with the Department of Intercollegiate Athletics.

## *Indoor Activities*

THE STUDENT ACTIVITIES BUILDING. This building houses the offices of the Department of Intercollegiate Athletics and the College of Physical Education, Recreation, and Health. It contains six activity teaching stations: the main arena, the swimming pool, the small gym, the weight training room, the wrestling room, and combination indoor golf driving range and dance studio. In addition, there are six classrooms, a research laboratory, a departmental library, and conference room.

The main arena of this building has a seating capacity of 12,004 and 19,796 sq. ft. of floor space. This arena provides facilities for class work in basketball, volleyball, badminton, and bait casting.

## FACILITIES

The swimming pool is divided into two areas by a permanent bulkhead. The shallow end is 42 x 24 feet and the large area is 42 x 75 feet with a depth ranging from 4 to 13 feet.

The small gymnasium may be used for basketball, volleyball, and gymnastics, including tumbling, trampolining and all types of apparatus work. The total floor space is 9,462 sq. ft.

The wrestling room (8,056 sq. ft.) is covered with mats.

The weight training class room is equipped with sufficient weights for 11 stations of three men each.

The dance studio-golf driving range (3,256 sq. ft.) has two nylon nets which provide four golf driving stations. In addition, part of the floor is covered with a green rug for putting practice. The nets may be raised so that the entire floor space is available for dancing.

**PREINKERT FIELD HOUSE.** Preinkert Field House contains the offices of some men and women teachers of Physical Education and Health Education. There is a regulation size swimming pool, 75 x 35 feet equipped with two one-meter diving boards. In the gymnasium, 90 x 50 feet, classes are held in badminton, volleyball, basketball, stunts and tumbling, apparatus and tennis. There are two large backboards used for indoor tennis practice. The adjacent classroom is used for professional classes and contains audio-visual equipment. The dance studio, used for modern dance classes, is 40 x 60 feet.

In addition to the above areas, there are locker and shower rooms used by those enrolled in physical education and those participating in recreational activities and a small lounge for major students.

**ARMORY.** The Armory is used primarily for an extensive men's intramural program. It houses the offices of the Director of Intramurals and an athletic equipment room from which students may secure equipment for recreational purposes. The 28,800 sq. ft. of floor space has four full length basketball courts, with badminton and volleyball courts superimposed on them. This facility is also used as an indoor track, with an indoor vaulting, high and broad jump pits, a one-tenth mile track, and a 70 yard straight-away.

**COLISEUM.** The Coliseum is used as a supplementary facility for the intramural and required program of physical education for men and women. Included in the facilities are an equipment issue room, adequate shower and locker rooms for both men and women, a classroom, and office space for several of the men's and women's physical education staff.

The 6,555 square feet of floor space is used primarily for required co-educational classes in square and social dance and for intramural basketball. In addition to the one large basketball court, however, there are five badminton and two volleyball courts available for co-ed class instruction.

### *Outdoor Activities*

**THE STADIUM.** The stadium, with a seating capacity of 33,536 has a one-quarter mile cinder track with a 220-yard straightaway. Pits are available for pole vaulting and high and broad jumping. Immediately east of the stadium are facilities for the shot put, discus and javelin throw. The College of Physical Education, Recreation, and Health use these facilities for required classes in track and field. Also east of the stadium are 13.1 acres devoted to three practice football fields, the baseball stadium, a practice baseball, lacrosse, and soccer field. The College uses these facilities for major skill classes in football, soccer, and baseball. West of the stadium are 11.3 acres devoted entirely to physical education out-door play fields. There are four combination soccer-touch football play fields, with complete goal posts, and four softball fields with wire backstops.

Surrounding the Armory are four touch football fields and eight softball fields, encompassing 18.4 acres. These fields, plus the four in the Fraternity Row horseshoe are used exclusively for intramurals.

Immediately west of the Cole Activities Building are eight all-weather tennis courts. A modern 18-hole golf course was opened in 1957. This 204-acre course includes two lakes, and an additional 5.8-acre golf driving range for instructional purposes. The golf driving range, equipped with lights, and the golf course greatly adds to our present recreational facilities. An outdoor playing field 300 feet by 600 feet is also provided for touch football, soccer, speedball and softball.

The outdoor facilities adjacent to the Preinkert Field House include eight hard surfaced tennis courts, an archery range with space for 18 targets, two softball diamonds and combination hockey and soccer fields.

### *Research Laboratory*

One of the important aspects of advanced study at the University of Maryland is research. To encourage research, the College of Physical Education, Recreation, and Health makes available to the student a spacious, well equipped research laboratory. Students and faculty alike are encouraged to make use of the laboratory and its facilities for the purpose of conducting their special research projects.

### *Cultural and Recreational Opportunities*

Near the University of Maryland are found many points of cultural and recreational interest. In Washington, D. C., one may visit national shrines and museums, e.g., the Smithsonian Institute, the Medical Museum, etc., and also attend lectures, musical recitals and stage productions, featuring outstanding personages. The Freer Gallery of Art and the Folger Shakespeare Library are located in Washington. Within from one to four hours traveling time by car one finds such points of historical and recreational interest as Mt. Vernon, Gettysburg, Harpers Ferry, Antietam, Annapolis,

## GENERAL INFORMATION

Monticello, Williamsburg, Jamestown, Yorktown, the Shenandoah Valley, Skyline Drive, Rehoboth Beach and Ocean City, Maryland. A number of Chesapeake Bay beaches and resorts can be reached from the campus within forty-five minutes. The University also makes available for recreational purposes, swimming pools, tennis courts, and similar facilities. During Summer School a special recreational program is conducted for all students; this includes sightseeing tours, group trips to summer stock stage productions, square dancing, musical events, sports tournaments, and movies.

## GENERAL INFORMATION

### *Admission*

**FALL SEMESTER.** All applications for full-time undergraduate admission for the Fall Semester at the College Park campus must be received by the University on or before July 15. Any student registering for seven (7) or more semester hours of work is considered a full-time student.

Under unusual circumstances, applications will be accepted between July 15 and September 1. Applicants for full-time attendance filing after July 1 will be required to pay a non-refundable \$25.00 late fee to defray the cost of special handling of applications after that date. This late fee is in addition to the \$10.00 application fee.

All undergraduate applications, both for full-time and part-time attendance, and all supporting documents for an application for admission must be received by the appropriate University office by September 1. This means that the applicant's educational records, ACT scores (in the case of new freshmen) and medical examination report must be received by September 1.

**SPRING SEMESTER.** The deadline for the receipt of applications for the Spring Semester is January 1.

**UNIVERSITY COLLEGE.** The application deadlines and fees *do not* apply to students registering in the evening classes offered by the University College.

**GRADUATE SCHOOL.** Application for admission to the Graduate School must be made by September 1 for the fall term and by January 1 for the spring term on blanks obtained from the Office of the Graduate School. Admission to the summer session is governed by the date listed in the

Summer School catalog. The summer session deadline date is generally June 1.

### *Entrance Requirements*

All students desiring to enroll in the College of Physical Education, Recreation, and Health must apply to the Director of Admissions of the University of Maryland at College Park.

Sixteen units of high school credit are required for admittance to this college. *Required* high school subjects are: four units of English, one unit of social science, and one unit of natural science. *Desirable* high school subjects include: algebra, plane geometry and additional natural and physical sciences, such as chemistry and physics.

Satisfactory health and physical vigor are essential for persons pursuing a career in the areas of this College.

### *Expenses*

Annual expenses of attending the University are approximately as follows: \$270.00 fixed charges, \$96.00 special fees, \$440.00 board, \$320.00 lodging for Maryland residents, or \$420.00 for residents of other states and countries. A matriculation fee of \$10.00 is charged all new students and is payable only once. A fee of \$10.00 must accompany a prospective student's application for admission. If a student enrolls for the term for which he applied, the fee is accepted in lieu of the matriculation fee. A charge of \$400.00 is assessed to all students who are non-residents of the State of Maryland.

For students enrolled in the physical therapy curriculum the annual cost for the junior and senior years (not including the summer of the senior year) taken on the Baltimore campus include: \$270.00 fixed charges (\$170.00 additional for non-residents); \$97.00-\$102.00 special fees and \$320.00 dormitory. Other expenses are estimated at \$800.00 for food and \$90.00 for books, uniforms and supplies.

*An Adventure in Learning*, the undergraduate catalog of the University, contains a detailed statement of fees and expenses and includes changes in fees as they occur. A copy may be requested from the Catalog Mailing Office, North Administration Building, University of Maryland at College Park.

### *Definition of Residence and Non-Residence*

Students who are minors are considered to be resident students if at the time of their registration their parents have been domiciled in the State of Maryland for at least six months.

The status of the residence of a student is determined at the time of his first registration in the University and may not thereafter be changed by him unless, in the case of a minor, his parents move to and become legal

## GENERAL INFORMATION

residents of Maryland by maintaining such residence for at least six months. However, the right of the minor student to change from a non-resident status to resident status must be established by him prior to the registration period set for any semester.

Adult students are considered to be residents if at the time of their registration they have been domiciled in Maryland for at least six months provided such residence has not been acquired while attending any school or college in Maryland or elsewhere. Time spent on active duty in the armed services while stationed in Maryland will not be considered as satisfying the six-months period referred to above except in those cases in which the adult was domiciled in Maryland for at least six months prior to his entrance into the armed service and was not enrolled in any school during that period.

The word "domicile" as used in this regulation shall mean the permanent place of abode. For the purpose of this rule only one domicile may be maintained.

### *Air Science Instruction*

The Department of Air Science offers two all-voluntary programs in Air Force ROTC at the University of Maryland. Successful completion of either the two-year or the four-year program qualifies a student for a commission in the United States Air Force upon graduation.

Selected students who wish to do so may, with proper approval, carry Advanced Air Science courses as electives during their junior and senior years. Financial assistance is provided for students in the Advanced program. Specific information on either the two-year or the four-year program is included in the *University General and Academic Regulations*.

### *For Additional Information*

Detailed information concerning the American Civilization Program, fees and expenses, scholarships and awards, student life, and other material of a general nature, may be found in the University publication titled *An Adventure in Learning*. This publication may be obtained on request from the Office of University Relations, North Administration Building, University of Maryland at College Park. A detailed explanation of the regulations of student and academic life, may be found in the University publication titled, *University General and Academic Regulations*. This is mailed in September and February of each year to all new undergraduate students.

Requests for course catalogs for the individual schools and colleges should be directed to the deans of these respective units, addressed to:

## UNDERGRADUATE PROFESSIONAL CURRICULA

### COLLEGES LOCATED AT COLLEGE PARK:

Dean  
(College in which you are interested)  
The University of Maryland  
College Park, Maryland 20740

### PROFESSIONAL SCHOOLS LOCATED AT BALTIMORE:

Dean  
(School in which you are interested)  
The University of Maryland  
Lombard and Greene Streets  
Baltimore, Maryland 21201

## UNDERGRADUATE PROFESSIONAL CURRICULA

### *Guidance*

At the time of matriculation and first registration, each student is assigned to a member of the faculty of the College who acts as the student's academic adviser. This faculty member will be in physical education, recreation, health education or physical therapy, depending on the student's choice of curriculum. The student should confer regularly with his adviser prior to and at the time of each registration.

### *Normal Load*

The normal load for students in this College is 15-19 credit hours per semester. The requirements in physical education and health for men and women are fulfilled by professional courses in the College. No student may register for more than 19 hours unless he has a "B" average for the preceding semester and approval of the Dean of the College.

### *Electives*

Electives should be planned carefully, and well in advance, preferably during the orientation course the first semester, or with the student's academic adviser during the second semester. It is important to begin certain sequences as soon as possible to prevent later conflict. Electives may be selected from any department of the University in accordance with a student's professional needs. Those selected must meet with the approval of the adviser and the Dean of the College.

### *Transfer Students*

Only students in good standing as to scholarship and conduct are eligible to transfer into this College from another college or university. Only

## UNDERGRADUATE PROFESSIONAL CURRICULA

courses applicable to his curriculum and passed with a grade of "C" or better will be transferred. Students wishing to transfer to this College from another college of this University are subject to the general University regulations on this subject, explained in the publication, *University General and Academic Regulations*.

### *Freshman and Sophomore Programs*

The work of the first two years in this College is designed to accomplish the following purposes: (1) provide a general basic or core education and prepare for later specialization by giving a foundation in certain basic sciences; (2) develop competency in those basic techniques necessary for successful participation in the professional courses of the last two years.

While much of the academic course work will be alike, the technique courses will vary considerably in the different curriculums. The core of University requirements should be completed in the first two years in such manner as to justify acceptance as a junior in the desired major. The technique courses must be satisfactorily completed, or competencies demonstrated before the student can be accepted for the advanced courses in methods and in student teaching. It is very important that each requirement be met as it occurs.

### *Junior Status*

Students are permitted to register for courses numbered 100 and above only after they have achieved junior status. Detailed information pertaining to junior status will be found in the *University General and Academic Regulations*.

### *Student Teaching*

Opportunity is provided for student teaching experience in Physical Education and/or Health Education. The student devotes eight weeks during his last semester of his senior year to observation, participation, and teaching under a qualified supervising teacher in an approved elementary, junior or senior high school or in a combined program at the elementary and secondary levels in the vicinity of the University. The student progresses to gradual assumption of all of the responsibilities of the supervising teacher. A University supervisor from the College of Physical Education, Recreation, and Health visits the student periodically and confers with both the student teacher and the cooperating teacher, giving assistance when needed.

To be eligible for student teaching, the student must (1) have an accumulative grade point average of at least a 2.3, (2) *must have the recommendation of the University supervising teacher*, and (3) *must have fulfilled all required courses for the B. S. degree except those in the Block Student Teaching Semester*. The student must obtain a grade of "C" or better in all professional courses in his curriculum and he must register for all

## UNDERGRADUATE PROFESSIONAL CURRICULA

courses in the "Block" concurrently. Those desiring to teach at the elementary level must have successfully completed P.E. 120 and must split their teaching experience into 4 hours of Sec.Ed. 148 and 4 hours of Sec.Ed. 149. Those desiring an elementary minor in physical education in addition, must complete P.E. 55, 57, and 195.

### *Degrees*

The degree of Bachelor of Science is conferred upon students who have met the conditions of their curricula as herein prescribed by the College of Physical Education, Recreation, and Health.

Each candidate for a degree must file a formal application with the Office of the Registrar eight weeks prior to the date of graduation.

### *Certification*

The Maryland State Department of Education certifies for teaching only when an applicant has a tentative appointment to teach in a Maryland county school. No certificate may be secured by application of the student on graduation. Course content requirements for certification are indicated with each curriculum. Certification is specifically limited to graduates who "rank academically in the upper four-fifths of the class and who make a grade of 'C' or better in student teaching." In order to insure the meeting of these requirements, students will not be approved for student teaching except as indicated below. A student intending to qualify as a teacher in Baltimore, Washington, or other specific situations should secure a statement of certification requirements before starting work in the junior year and discuss them with his academic adviser.

# Professional Curricula

## PHYSICAL EDUCATION

This curriculum prepares students (1) for teaching physical education in the secondary school, (2) for coaching, and (3) for leadership in youth and adult groups which offer a program of physical activity. The first two years of this curriculum are considered to be an orientation period in which the student has an opportunity to gain an adequate background in general education as well as in those scientific areas closely related to this field specialization. In addition, there is considerable emphasis placed upon the development of skills in a wide range of motor activities. Further, students are encouraged to select related areas, especially in the fields of biology, social science, psychology, health education, and recreation as fields of secondary interest. These materially increase the vocational opportunities which are available to a graduate in physical education.

**EQUIPMENT:** Students may be required to provide individual equipment for certain courses.

**UNIFORMS:** Suitable uniforms, as prescribed by the College are required for the activity classes and for student teaching. These uniforms should be worn only during professional activities.

*Men*—During the freshman and sophomore years, men will wear red and black T-shirts, black trunks, white socks, gym shoes, supporter and sweat suit. During the junior year, men will purchase full length black pants with gold braid on side and a black jacket, which are required for student teaching.

*Women*—Tailored blue shorts, white shirt, ankle socks, and tennis shoes, and leotard and skirt, and warm-up suit.

*For Student Teaching*—An appropriate teaching costume will be selected under the guidance of the supervisor of student teaching before the beginning of the junior year.

# PHYSICAL EDUCATION CURRICULUM

## PHYSICAL EDUCATION CURRICULUM FOR MEN

	Semester	
	I	II
<b>FRESHMAN YEAR <sup>1</sup></b>		
Eng. 1—Composition .....	3	..
Social Science Elective <sup>2</sup> .....	..	3
Math. (any above Math. 1) <sup>1</sup> .....	3	..
Zool. 1—General Zoology .....	..	4
Speech 7—Public Speaking .....	2	..
Hea. 40—Personal and Community Health .....	..	3
P. E. 30—Introduction to Physical Education and Health ..	2	..
P. E. 50—Rhythmic Activities .....	2	..
P. E. 61, 63—Skills Laboratory .....	2	2
P. E. 77—Aquatics .....	..	2
Electives .....	3	3
Total .....	17	17
<b>SOPHOMORE YEAR</b>		
Eng. 3, 4—Composition and World Literature .....	3	3
Zool. 14, 15—Human Anatomy and Physiology .....	4	4
Social Science Elective .....	3	..
P. E. 65, 67—Laboratory Skills .....	2	2
History 21—American History .....	..	3
Science Group Requirement (Physics or Chemistry 1) .....	..	4
Hea. 50—First Aid .....	1	..
Electives .....	4	1
Total .....	17	17
<b>JUNIOR YEAR</b>		
History elective .....	3	..
Fine Arts elective .....	..	3
P. E. 100—Kinesiology .....	4	..
P. E. 105, 107—Skills Laboratory .....	2	2
P. E. 114—Methods, Curriculum and Observation for Secondary Schools .....	4	..
P. E. 120—Physical Education for the Elementary School ..	..	3
Theory of Coaching elective (P. E. 123, 125, or 126) .....	2	..
P. E. 180—Measurement in Physical Education and Health ..	..	3
Education 111—Foundations of Education .....	..	3
Electives .....	2	3
Total .....	17	17

<sup>1</sup> Students whose ACT score in Mathematics is 20 or below must take Math 1 the first semester of their Freshman year.

<sup>2</sup> Students must elect 6 hours in the Social Sciences. Two courses may be chosen from five fields: Anthropology 1; Economics 31 or 37; Government and Politics 1; Psychology 1; or Sociology 1.

## PHYSICAL EDUCATION CURRICULUM

SENIOR YEAR	Semester	
	I	II
Ed. 110—Human Development and Learning .....	6	..
P. E. 133—Adapted Physical Education .....	..	2
Ed. 145—Principles and Methods of Secondary Education ..	..	3
S. E. D. 148 <sup>3</sup> —Student Teaching in Secondary Schools ..	..	8
P. E. 160—Theory of Exercise .....	3	..
P. E. 181—Advanced Training and Conditioning .....	3	..
P. E. 190—Organizations and Administration of Physical Education .....	..	3
P. E. 193—History and Philosophy of Sport and Physical Education .....	3	..
Electives .....	3	..
<b>Total</b> .....	<b>18</b>	<b>16</b>

## PHYSICAL EDUCATION CURRICULUM FOR WOMEN

FRESHMAN YEAR <sup>3</sup>	I	II
Eng. 1, 3—Composition and Literature .....	3	3
Social Science Elective <sup>4</sup> .....	..	3
Zool. 1—General Zoology .....	4	..
Speech 7—Public Speaking .....	2	..
Math. 1, 3 or 10 (any above Math. 1) .....	0	3
P. E. 30—Introduction to Physical Education and Health ..	2	..
P. E. 40w—Fundamentals of Movement .....	2	..
P. E. 50—Rhythmic Activities .....	2	..
Dance 52—Dance Techniques .....	..	2
P. E. 62w, 64w—Skills Laboratory .....	2	2
Hea. 40—Personal and Community Health .....	..	3
Electives .....	..	1
<b>Total</b> .....	<b>17</b>	<b>17</b>

<sup>3</sup> Students whose ACT score in Mathematics is 20 or below must take Math. 1 the first semester of their Freshman year.

<sup>4</sup> Students must elect 6 hours in the Social Sciences. Two courses may be chosen from five fields: Anthropology 1; Economics 31 or 37; Government and Politics 1; Psychology 1; or Sociology 1.

<sup>5</sup> The qualified student may register for four credits in Sc.Ed. 148 and four credits in E.C.Ed. 149.

# PHYSICAL EDUCATION CURRICULUM

## SOPHOMORE YEAR <sup>6</sup>

	Semester—	
	I	II
Eng. 4—World Literature .....	3	..
Zool. 14, 15—Human Anatomy and Physiology .....	4	4
Social Science Elective .....	3	..
Hist. 21—American History .....	..	3
Science Group Requirement (Chemistry 1 or Physics 1) ....	..	4
Hea. 50—First Aid .....	1	..
Dance 52, 54—Dance Techniques .....	1	2
P. E. 66w, 68w—Skills Laboratory .....	2	2
P. E. 77w—Aquatics .....	..	2
P. E. 82—Organization and Administration of Intermurals ..	1	..
Electives .....	2	..
Total .....	17	17

## JUNIOR YEAR

Fine Arts Elective .....	..	3
History Elective .....	3	..
P. E. 100—Kinesiology .....	4	..
P. E. 105, 107—Laboratory Skills .....	2	2
Educ. 111—Foundations of Education .....	..	3
P. E. 114—Methods in Physical Education in Secondary Schools .....	4	..
P. E. 120—Physical Education for the Elementary Schools ..	..	3
P. E. 124—Theory of Coaching .....	2	..
P. E. 180—Measurement in Physical Education and Health ..	..	3
Electives .....	2	3
Total .....	17	17

## SENIOR YEAR

Ed. 110—Human Development and Learning .....	6	..
Sec. Ed. 145—Principles and Methods of Secondary Education ..	..	3
Sec. Ed. 148—Student Teaching in Secondary Schools .....	..	8
P. E. 133—Adapted Physical Education .....	..	2
P. E. 160—Theory of Exercise .....	3	..
P. E. 190—Organization and Administration of Physical Education .....	..	3
P. E. 193—History and Philosophy of Sports and Physical Education .....	3	..
Electives .....	6	..
Total .....	18	16

<sup>6</sup> P. E. 72w may be required, depending upon the swimming ability of the student.

## PHYSICAL EDUCATION CURRICULUM

### REQUIREMENTS FOR DEGREE IN PHYSICAL EDUCATION

Requirements for the Bachelor of Science degree in physical education in the College of Physical Education, Recreation and Health are as follows:

<i>Men</i>	<i>Sem. Cr.</i>
Professional Physical Education courses (P.E. 30, 50, 61, 63, 65, 67, 77, 100, 105, 107, 114, 120, (123 or 125 or 126), 133, 160, 180, 181, 190, 193) .....	48
Foundation Science courses as presented (Zool. 1, 14, 15; Phys. 1 or Chem. 1) .....	16
Education courses as prescribed .....	20
General Education Requirements (Eng. 1, 3, 4; Fine Arts 3 hrs.; Hist. 21, plus 3 hrs.; Math. 3 or 10; Soc. Sc. 6 hrs.; Science, as shown above) .....	27
Specially prescribed requirements (Sp. 7) .....	2
Health courses as prescribed (Hea. 40, 50) .....	4
Electives .....	19
<b>Total</b> .....	<b>136</b>

<i>Women</i>	
Professional Physical Education courses (P.E. 30, 40w, 50, 52, 54, 62, 64, 66, 68, 77w, 82w, 100, 105, 107, 114, 120, 124, 133, 160, 180, 190, 193) .....	51
Foundation Science courses as prescribed (Zool. 1, 14, 15; Phys. 1 or Chem. 1) .....	16
Education courses as prescribed .....	20
General Education Requirements (Eng. 1, 3, 4; Fine Arts 3 hrs.; Hist. 21, plus 3 hrs.; Math. 3 or 10; Soc. Sc. 6 hours; Science, shown above) .....	27
Specially prescribed requirements (Sp. 7) .....	2
Health courses as prescribed (Hea. 40, 50) .....	4
Electives .....	16
<b>Total</b> .....	<b>136</b>

### MINOR IN PHYSICAL EDUCATION

20 semester hours in physical education and 4 semester hours in cognate areas.

### REQUIRED COURSES

Men—P.E. 30; P.E. 61, 63, 65, 67, (2-6'); P.E. 113; P.E. 101 or 103.  
Women—P.E. 30; P.E. 62, 64, 66, 68, (2-6'); P.E. 114, 116; P.E. 124, 126.

\* Selection of courses will be made according to student's background.

ELECTIVE COURSES

Men and Women—P.E. 69, 78, 100; P.E. 123; P.E. 125; P.E. 140; P.E. 160; P.E. 180; P.E. 190; Hea. 110; Hea. 120; Rec. 30; Rec. 40; Rec. 100; Rec. 150; Rec. 170.

If planning to teach, the cognate courses for men should be Hea. 40 and Hea. 50; for women, Hea. 50 and Hea. 120. Men should include P.E. 123 or P.E. 125 if planning to coach.

Note: To be certified to teach in Maryland, 30 semester hours are required in this area, including the following or equivalent: Zool. 14, 15; Hea. 50; P.E. 100, 140; Ed. 145 and Ed. 148 including at least 25 hours of student teaching.

MINOR IN ELEMENTARY SCHOOL PHYSICAL EDUCATION

There are two plans for a minor in elementary school physical education. Plan A is for students in the College of Physical Education, Recreation, and Health, and Plan B is for students outside the College of Physical Education, Recreation, and Health.

I. Plan A. (for students in this College)

10 semester hours in elementary school physical education courses and 10 hours in cognate areas.

*Required courses*

P.E. 55, 57, 120, 195.

*Elective courses*

10 hours in any of the following cognate areas: human development, elementary education, biological science, health education. (Not more than 6 hours shall be taken in any one cognate area.)

*Student teaching*

Students will be required to do 4 weeks of their 8 weeks student teaching at the elementary school level in physical education.

II. Plan B. (for students outside this College)

13 semester hours in elementary school physical education courses and 10 hours in cognate areas.

*Required courses*

P.E. 55, 57, 120, 130, 195.

*Elective courses*

10 hours in any of the following cognate areas: human development, elementary education, biological science, health education. (Not more than 6 hours shall be taken in any one cognate area.)

RELATED FIELDS MINOR

This minor requires a minimum of 18 credit hours to be elected from any three of the four following areas:

## DANCE CURRICULUM

- I. Health Education —6 hours
  - a. Hea. 120—Methods and Materials in Health Education.
  - b. Hea. 150—Health Problems of Children and Youth.
- II. Recreation—6 hours
  - a. Rec. 120—Program Planning
  - b. Rec. 170—General Fundamentals of Recreation
- III. Safety Education—6 hours
  - a. Hea. 70—Safety Education
  - b. Hea. 80—The Driver, His Characteristics and Improvement
- IV. Dance—6 hours<sup>\*</sup>
  - a. P.E. 55
  - b. Dance 54, 70, 80
  - c. P.E. 50
  - d. Dance 60, 192

## DANCE

With the increasing recognition of the importance and scope of dance in educational programs, the need for teachers adequately trained in dance far exceeds the number available. The professional curriculum in dance is constructed to meet the steadily rising demand for personnel qualified to teach dance in college, secondary, elementary schools, in camps, recreational agencies and in preparation for dance therapy.

The course of study provides general background knowledge in culture and foundation sciences as well as particularization in dance skills, theory and philosophy. Courses in music, theory, acting and stagecraft answer additional needs for dance production planning. Students are urged to enrich their background in an interchange in creative arts in other departments of the University, and opportunity is given to serve as assistants in the non-professional program.

Through electives the program may be adapted to meet the interests of the particular student, combining dance with fine arts, physical education, recreation, theatre, speech therapy, nursery school-kindergarten education, psychology, elementary education.

The majors in dance have performance opportunities in the Dance Group which presents one major concert each year, and the Demonstration Group which performs on and off campus.

Additional dance experience is available in nearby Washington for the student who may wish to visit professional studios. Many opportunities

---

<sup>\*</sup> Selection of courses will be made according to student's background and interests upon consultation with the dance advisor.

## DANCE CURRICULUM

FRESHMAN YEAR<sup>9</sup>

Semester

	I	II
Eng. 1—Composition and American Literature .....	3	..
G. & P. 1—American Government + Soc. Sc. choice .....	3	3
Zool. 1—General Zoology .....	4	..
Speech 8—Acting .....	..	3
P. E. 30—Introduction to Physical Education, Recreation and Health .....	..	2
P. E. 40—Basic Body Controls .....	..	2
P. E. 50—Rhythmic Activities .....	2	..
Dance 52—Dance Techniques .....	1	..
P. E. 62—Elementary Techniques of Sports .....	..	2
Hea. 40—Personal and Community Health .....	..	3
Math 10—Introduction to Mathematics <sup>10</sup> .....	3	..
Total .....	16	15

## SOPHOMORE YEAR

Eng. 3, 4—Composition and World Literature .....	3	3
Hist. 21 or 22—History plus Hist. Choice .....	3	3
Zool. 14, 15—Human Anatomy and Physiology .....	4	4
Dance 54—Dance Techniques .....	2	..
Dance 60—Dance Composition .....	..	2
Hea. 50—First Aid and Safety .....	..	1
Music 20—Survey of Music Literature; and Music 7—Theory of Music or Music 16 .....	3	3
Electives <sup>11</sup> .....	3	..
TOTAL .....	81	16

## JUNIOR YEAR

Dance 70, 80—Intermediate and Advanced Dance .....	2	2
P. E. 100—Kinesiology .....	4	..
P. E. 114—Methods in Physical Education for Secondary Schools .....	..	4
Dance 182—History of Dance .....	3	..
Dance 192—Percussion Accompaniment and Music for Dance .....	3	..
Drama Choice .....	3	..
Art or Music (100 Level) <sup>12</sup> .....	..	6
Ed. 110—Human Development and Learning .....	6	..
Electives <sup>12</sup> .....	10	1
TOTAL .....	18	81

<sup>9</sup> P. E. 72 may be required, depending on the swimming ability of the student.<sup>10</sup> Students who fail the qualifying exam take Math 1.<sup>11</sup> Students must elect one of the following: A.D. 1-Design, Art 5, Art 15, Art 20.<sup>12</sup> P. E. 90 Workshop 1-6 credits required of dance majors.<sup>13</sup> By permission of dance adviser only.

## DANCE CURRICULUM

### SENIOR YEAR

	<i>Semester</i>	
	<i>I</i>	<i>II</i>
Dance 110—Dance Production .....	3	..
Ed. 111—Foundations of Education .....	3	..
Dance 184—Theory and Philosophy of Dance .....	3	..
P. E. 190—Administration and Supervision of Physical Education, Recreation and Health .....	..	3
Ed. 145—Principles and Methods of Secondary Education..	..	3
Ed. 148—Student Teaching in the Secondary Schools <sup>15</sup> .....	..	8
Electives <sup>14</sup> .....	10	1
<b>TOTAL</b> .....	<b>16</b>	<b>15</b>

### REQUIREMENTS FOR DEGREE IN DANCE<sup>14</sup>

Requirements for the Bachelor of Science degree in physical education, with a major in dance are as follows:

College dance courses P.E. 50, 52, 54, 60, 70, 80, 110, 182, 184, 192 .....	22
Prescribed courses in related areas P.E. 30, 40, 62, 100, 114, 190; Music 7 or 16, 20; Speech 8; Art or Music (100 Level) Drama Choice; Art 5, Art 15, or Art 20 .....	33
Prescribed Health Courses (Hea. 40, 50) .....	4
General requirements Eng. 1, 3, 4; H. 21, 22 and choice Math; G. & P. 1 plus Soc. Sc. choice .....	24
Foundation Science Courses (Zool. 1, 14, 15) .....	12
Education courses as prescribed .....	17
Electives .....	20
<b>TOTAL</b> .....	<b>132</b>

**MINOR IN DANCE:** The minor in dance is adapted to meet the needs of students majoring in such areas as speech, music, art, nursery school-kindergarten education, psychology, elementary education, recreation, and physical education. Other combinations may be considered depending on the student's interest and background.

The minor shall consist of a significant group of courses totaling 18-20 semester hours. The required courses in the dance area will be chosen from the following: Skills in Modern Dance, Dance 52, 54, 70, 80 (Beginning through Advanced); Dance 55, Elementary School Rhythmic Activities; Dance 60, Composition and Methods; P.E. 50, Rhythmic Activities; Dance 110, Dance Production; Dance 182, History of Dance; Dance 184, Theory and Philosophy of Dance; Dance 192, Percussion and Music for Dance. Electives shall be selected from the cognate areas depending on the student's major. All programs must be approved by the department adviser.

**SUGGESTED MINORS FOR THE DANCE MAJOR:** Music, Art, physical education, recreation, split sociology-psychology, speech and drama.

<sup>14</sup> P. 5, 90 Workshop 1-6 credits required of dance majors.

<sup>15</sup> When Ed. 148 is taken Ed. 145, P. E. 190 must be scheduled concurrently. This may be done either semester.

## RECREATION CURRICULUM

The increased amount of leisure time existent in our society because of the rapid development of modern civilization, and the imperative need for guidance in the wise use of that leisure time has made us cognizant of the need for trained recreation leaders.

This curriculum, therefore, is designed to meet the needs of students who wish to qualify for the many positions in the field of recreation, and the needs of those students who desire a background of culture and skills which will enable them to render distinct contributions to community life. The College draws upon various other departments and colleges within the University for courses to balance and enrich its offerings for its recreation curriculum.

Those majoring in recreation have opportunity for observation and practical experience in local, county, state and federal public recreation programs, in social and group work agency programs, and in the various programs of the Armed Forces, American Red Cross, local hospitals, etc. Major students are encouraged to select an 'option' area of interest around which to center their elective courses (for instance: public recreation, recreation for the ill and handicapped, outdoor recreation, etc.)

## RECREATION CURRICULUM (Men &amp; Women)

FRESHMAN YEAR	<i>Semester Hrs.</i>
Eng. 1—Composition .....	3
Zool. 1 or Bot. 1—General Zoology or General Botany .....	4
Soc. 1—Introduction to Sociology .....	3
Psych. 1—Introduction to Psychology .....	3
Sp. 1—Public Speaking .....	3
Math. 1—Review of High School Algebra (if required) .....	0
A. D. 1—Fundamentals of Design .....	3
Fine Arts Requirement .....	3
Rec. 30—History and Introduction to Recreation .....	2
Health 40—Personal and Community Health .....	3
P. E. 50—Rhythmic Activities .....	2
Physical Education Activities (60 Series, or 105-107) .....	4
(choice of activities depends upon student's background and interest)	
Total .....	33

## RECREATION CURRICULUM

### SOPHOMORE YEAR

	<i>Semester Hrs.</i>
Eng. 3 and 4—World Literature .....	6
Hist. 21 or 22—History of the United States .....	6
(and one elective History course)	
G. & P. 1—American Government .....	3
Math. 10—Introduction to Mathematics .....	3
Sp. 10—Group Discussion .....	2
Cr. 2—Simple Crafts .....	2
Music 16—Fundamentals for the Classroom Teacher .....	3
Rec. 40—Camp Counseling and Administration (or Rec. 150, if experienced) .....	2
Hea. 50—First Aid and Safety .....	1
Science Requirement .....	4(or 3)
<b>Total</b> .....	<b>32</b>

### JUNIOR YEAR

	<i>Semester Hrs.</i>
Soc. 118—Community Organization .....	3
Sp. 113 or 127—Play Production or Children's Dramatics .....	3
P. E. 114—Methods in Physical Education for Secondary Schools .....	3
Rec. 100—Co-recreational Games and Programs .....	2
Rec. 110—Naturelore .....	2
Rec. 120—Program Planning .....	3
Rec. 180—Leadership Techniques and Practices .....	3
Option requirements and electives .....	15
<b>Total</b> .....	<b>34</b>

### SENIOR YEAR

	<i>Semester Hrs.</i>
H. D. Ed. 106—Study of Human Behavior .....	3
Rec. 140—Observation and Field Work in Recreation .....	5
Rec. 185—Planning, Design and Maintenance of Park and Rec- reation Areas and Facilities .....	3
Rec. 190—Organization and Administration of Recreation .....	3
Option requirements and electives .....	20
<b>Total</b> .....	<b>34</b>

NOTE: Air Science is optional

Swimming courses will be required only of non-swimmers

Sp. 4, Voice and Diction, is required only of those with speech problems

## REQUIREMENTS FOR DEGREE IN RECREATION

Requirements for the Bachelor of Science degree in recreation in the College of Physical Education, Recreation, and Health are as follows:

*Men and Women*

	<i>Semester Hrs.</i>
College recreation courses (Rec. 10, 30, 40 or 150, 100, 110, 120, 140, 180, 185, 190) .....	25-26
Prescribed courses in related areas (P.E. 50, 60 series—4 cr., 114; A.D. 1; Cr., 2; Music 16; Soc. 1, 118; Sp. 1, 10, 113 or 127; Psych. 1; H.D.Ed. 106) .....	37
Additional prescribed courses in one recreation option area (public recreation, recreation for the ill & handicapped or outdoor recreation) .....	12
Prescribed Health course (Hea. 40, 50) .....	4
General Education requirements (Eng. 9 cr.; Hist. 6 cr.; Fine Arts 3 cr.; Soc. Sc. 3 cr.; Science 8 cr.; Math. 3 cr.) .....	32
Electives (to encourage proficiency in one skill area, and provide for a minor) .....	23
Total .....	133

## MINOR IN RECREATION

18 semester hours in recreation and 6 semester hours in cognate areas.

## REQUIRED COURSES

10 hours in Rec. 30, 40, 110, 120, 150, 170, 180, 185 or 190; Rec. 100; Soc. 118.

6 hours of work in areas of the recreational skills—nature, arts and crafts, speech and dramatics—but *not* in the area of the student's major.

2 hours of work in the areas of swimming, sports and dance skills, (men)—P.E. 50, 59, 61, 63, 65, 67; (women)—P.E. 40, 50, 52, 54, 56, 58, 62, 64, 66, 68, 72, 74, 76, 78.

OR other courses approved by the student's adviser and the various departments involved, depending upon the student's interest and background.

## ELECTIVE COURSES

6 hours in cognate areas of sociology, psychology, etc., on approval of the student's adviser.

## RECOMMENDED ELECTIVE COURSES

C. Ed. 115, 116; Cr. 3, 5, 20, 21, 30, 31, 40, 41; Ed. 52, 147; Ind. Ed. 2, 9; Journ. 10; Music 1, 4, 5, 10, 15, 50; P.E. 180; Pr. Art 38 or 39; Psych. 121, 125, 126; R. Ed. 114; Soc. 13, 14, 62, 113, 131, 153; Speech 102, 129.

## HEALTH EDUCATION CURRICULUM

### HEALTH EDUCATION

This curriculum is designed to prepare the student to give leadership in the development of the school health education program including (1) health services, (2) healthful environment, and (3) health teaching. Graduates in this area have placement opportunities in schools, colleges, and in public and private health agencies. The minor is planned to be particularly suitable for students who are majoring in physical education, education, home economics, and childhood education.

### HEALTH EDUCATION CURRICULUM FOR MEN

	Semester	
	I	II
FRESHMAN YEAR		
Eng. 1, 3—Composition and American Literature.....	3	3
Soc. 1—Sociology of American Life .....	3	..
Zool. 1—General Zoology .....	..	4
Speech 7—Public Speaking .....	2	..
Hea. 30—Introduction to Physical Education, Rec., & Health	2	..
P. E. 1—Orientation to Physical Education .....	1	..
P. E. 3—Developmental and Combative Sports .....	..	1
Chem. 11, 13—General Chemistry .....	3	3
Anth. 1—Introduction to Anthropology .....	..	3
Electives .....	3	3
Total .....	17	17
SOPHOMORE YEAR		
Eng. 4—World Literature .....	..	3
History .....	3	3
Zool. 14, 15—Human Anatomy and Physiology.....	4	4
Hea. 40—Personal and Community Health.....	3	..
Hea. 50—First Aid and Safety .....	..	1
Hea. 70—Safety Education .....	1	..
Phil. 1—Introduction to Philosophy.....	3	..
Math. ....	..	3
Electives .....	..	3
Total .....	16	18

## HEALTH EDUCATION CURRICULUM

	Semester	
	I	II
<b>JUNIOR YEAR</b>		
Microb. 1—General Microbiology .....	4	..
Microb. 108—Epidemiology and Public Health .....	..	2
Nutr. 20—Elements of Nutrition .....	..	3
Ed. 150—Educational Measurement or		
Hea. 180—Measurement in Physical Education and Health	2-3	..
Hea. 110—Introduction to School Education .....	2	..
Hea. 120—Methods & Materials in Health Education .....	..	3
Ed. 110—Human Development and Learning .....	6	(6)
Psych. 1—Introduction to Psychology .....	3	..
Psych. 5—Mental Hygiene .....	..	3
Ed. 111—Foundations of Education .....	3	..
Electives .....	..	4
<b>Total</b> .....	<hr/>	<hr/>
<b>SENIOR YEAR</b>		
Hea. 140—Curriculum, Instruction and Observation .....	3	..
Hea. 150—Health Problems of the School Child .....	..	3
Hea. 190—Administration and Supervision of School		
Health Education .....	3	..
Ed. 145—Principles and Methods of Secondary Education ..	3	..
Ed. 148—Student Teaching in Secondary Schools <sup>16</sup> .....	8	..
Electives .....	..	14
<b>Total</b> .....	<hr/>	<hr/>
	17	17

## HEALTH EDUCATION CURRICULUM FOR WOMEN

### FRESHMAN YEAR

Eng. 1, 3—Composition and American Literature .....	3	3
Soc. 1—Sociology of American Life .....	3	..
Zool. 1—General Zoology .....	..	4
Speech 7—Public Speaking .....	2	..
Hea. 30—Introduction to Physical Education, Recreation,		
and Health .....	2	..
P. E. 2, 4—Orientation Activities, Swimming .....	1	1
Chem. 11, 13—General Chemistry .....	3	3
Anth. 1—Introduction to Anthropology .....	..	3
Electives .....	3	3
<b>Total</b> .....	<hr/>	<hr/>
	17	17

<sup>16</sup> When Ed. 148 is taken, Ed. 145, Hea. 140 and Hea. 190 must be scheduled concurrently. This may be done either semester.

# HEALTH EDUCATION CURRICULUM

	Semester	
	I	II
<b>SOPHOMORE YEAR</b>		
Eng. 4—World Literature .....	..	3
History .....	3	3
Zool. 14, 15—Human Anatomy and Physiology .....	4	4
Hea. 40—Personal and Community Health .....	3	..
Hea. 50—First Aid and Safety .....	..	1
Hea. 70—Safety Education .....	..	3
Phil. 1—Introduction to Philosophy .....	3	..
Math. ....	..	3
Electives .....	3	..
Total .....	16	17
<b>JUNIOR YEAR</b>		
Microb. 1—General Microbiology .....	4	..
Microb 108—Epidemiology and Public Health .....	..	2
Nutr. 20—Elements of Nutrition .....	..	3
Ed. 50—Educational Measurement or Hea. 180—Measurement in Physical Education and Health	2-3	..
Hea. 110—Introduction to School Health Education .....	2	..
Hea. 120—Methods and Materials in Health Education .....	..	3
Hea. 110—Introduction to School Health Education .....	2	..
Psych. 1—Introduction to Psychology .....	3	..
Psych. 5—Mental Hygiene .....	..	3
Educ. 111—Foundations of Education .....	3	..
Electives .....	..	4
Total .....	16-17	15
<b>SENIOR YEAR</b>		
Hea. 140—Curriculum, Instruction and Observation .....	3	..
Hea. 150—Health Problems of the School Child .....	..	3
Hea. 190—Administration and Supervision of School Health Education .....	3	..
Ed. 145—Principles of High School Teaching .....	3	..
Ed. 148—Student Teaching in the Secondary School <sup>17</sup> ....	8	..
Electives .....	..	14
Total .....	17	17

<sup>17</sup> When Ed. 148 is taken Ed. 145, Hea. 140 and Hea. 190 must be scheduled concurrently. This may be done either semester.

## HEALTH EDUCATION CURRICULUM

### REQUIREMENTS FOR DEGREE IN HEALTH EDUCATION

Requirements for the Bachelor of Science degree in health education in the College of Physical Education, Recreation, and Health are as follows:

<i>Men</i>	<i>Sem. Cr.</i>
Foundation science courses (Zool. 1, 14, 15; Microb. 1, 108; Chem. 11, 13) .....	24
General Requirements (Eng. 1, 3, 4; Phil. 1; Anth. 1; Soc. 1; History (6 hours); Math. (3 hours) .....	27
Other specified requirements (Speech 7; Psych. 1, 5; Nutr. 20) .....	11
Professional Health Education courses (30, 40, 50, 70, 110, 120, 140, 150; Ed. 150, or Hea. 180; Hea. 190) .....	28
Education courses (Ed. 110, 111; Ed. 145, 148) .....	20
University requirements in physical activity (P. E. 1, 3) .....	2
Electives .....	21
Total .....	130
 <i>Women</i>	
Foundation science courses (Zool. 1, 14, 15; Microb. 1, 108; Chem. 11, 13) .....	24
General Requirements (Eng. 1, 3, 4; Phil. 1; Anthrop. 1; Soc. 1; History (6 hours); Math. (3 hours) .....	27
Other specified requirements (Speech 7; Psych. 1, 5; Nut. 20) .....	11
Professional Health Education courses (30, 40, 50, 70, 110, 120, 140, 150; Ed. 150, or Hea. 180; Hea. 190) .....	28
Education courses (Ed. 110, 111; Ed. 145, 148) .....	20
University requirements in physical activity (P. E. 2, 4) .....	2
Electives .....	21
Total .....	130

### MINOR IN HEALTH EDUCATION

12 semester hours in health education and 12 semester hours in related areas.

#### REQUIRED COURSES

Hea. 40 (women); Hea. 40 (men); Hea. 50 (1), Hea. 110 (2), Hea. 120 (3) and Hea. 150 (3).

#### ELECTIVE COURSES IN RELATED AREAS

6 semester hours of biological sciences and 6 semester hours of psychology or human development.

### MINOR IN SAFETY EDUCATION

Students wishing to obtain a minor in safety education and become certified to teach Safety and Driver Education in junior and senior high schools

## MINORS

should take the following courses: Hea. 50 (1), Hea. 60 (2), Hea. 70 (3), Hea. 80 (3), Hea. 105 (3), and Hea. 145 (3); F.P. 104 (3) and F.P. 105 (3).

## MINOR IN OTHER AREAS

It is relatively easy for any student majoring in one curriculum of this College to complete the requirements for a minor in a cognate area of the College, as indicated after each major curriculum. Those who plan to teach in the public schools might wish to also qualify in another area. This is more difficult with the limited number of elective credits and must be planned carefully in advance. If it seems advisable, the Dean may waive certain required courses to allow development of a needed minor, or the student may be able to carry a heavier load than normal if his grade average permits.

Students majoring in physical education or health education should begin preparing for a teaching minor in a subject matter area during the sophomore year, if possible. Many opportunities exist in junior and senior high schools for a combination teacher of physical education and/or coach and a teacher of science, mathematics, history, etc. For a teaching minor, Ed. 140 should be taken in the minor field and student teaching should be split between the major and minor fields.

### ENGLISH MINOR

A minor in English requires 23 semester hours. It includes 9 semester hours of composition and literature, 3 semester hours of advanced American literature, and 11 hours of electives. Electives must be chosen with the approval of the adviser and with the recommendations of the English Department.

### MATHEMATICS MINOR

Two options should be noted for those desiring to take a concentration in math. If a person scored in Category 1 of the Math Placement Test, he should follow option 1 — if he scored in category 2, he should follow option 2.

<i>Option 1</i>		<i>Option 2</i>	
Math 18.....	3 hrs	Math 10.....	3
Math 19.....	4	Math 11.....	3
Math 20.....	4	Math 14.....	3
Math 21.....	4	Math 15.....	3
Math 100.....	3)	Math 100.....	3)
Math 133.....	3) any one	Math 133.....	3) any one
Math 170.....	4)	Math 170.....	4)
	<hr/>		<hr/>
	18-19		15-16

## PSYCHOLOGY MINOR

For a minor in Psychology at least 21 semester hours are required. The student should select either the biological or the sociological approach to this minor.

- A. Biological: Psychology 1, Introduction to Psychology (3); Psychology 26, Developmental Psychology (3); Psychology 90, Statistical Methods in Psychology (3); Psychology 145, Experimental Psychology—Sensory Processes (4); Psychology 146, Experimental Psychology—Learning, Motivation and Problem Solving (4); Psychology 148, Psychology of Learning (3); Psychology 180, Physiological Psychology (3).
- B. Sociological: Psychology 1, Introduction to Psychology (3); Psychology 5, Personality and Adjustment (3); Psychology 21, Social Psychology (3); Psychology 26, Developmental Psychology (3); Psychology 90, Statistical Methods in Psychology (3); Psychology 147, Experimental Psychology—Social Behavior (4); Psychology 148, Psychology of Learning (3).

## SOCIAL SCIENCE MINOR

For a minor in this group, 24 semester hours are required as follows: History, 18 semester hours (including one year each of American and European history), economics, sociology, government, consumer education or geography, 6 semester hours.

## SCIENCE MINORS

- A. General Science: 30 semester hours are required for a minor in general science including the following courses: Chem. 1, 3, General Chemistry (4, 4); Zool. 1, General Zoology (4); Bot. 1, General Botany (4); Phys. 1, 2, Elements of Physics (3, 3) or Phys. 10, 11, Fundamentals of Physics (4, 4). The remaining 6 or 8 semester hours will be chosen subject to the approval of the student's major adviser and of the science department in which his interest lies. Zool. 14 and 15 (4, 4) are approved courses.
- B. Biological Minor: 20 semester hours are required for a biological minor and will include the following courses: Zool. 1, General Zoology (4); Zool. 14, and 15, Human Anatomy and Human Physiology (4, 4); Chem. 1, General Chemistry (4); Bot. 1, General Botany (4).
- C. Minors of 20 semester hours are also offered in chemistry and physics. A minor in physics must be supported by a one-year course in chemistry. A minor in chemistry must be supported by a one-year course in physics. Other courses will be chosen subject to the approval of the student's major advisor and the science department in which the student's interest lies.

## PHYSICAL THERAPY

### SOCIOLOGY MINOR

For a minor in Sociology at least 18 semester hours are required as follows: Sociology 1, Sociology of American Life (3); Sociology 2, Principles of Sociology (3); three semester hours chosen from Sociology 112, Rural-Urban Relations (3), Sociology 114, The City (3), Sociology 118, Community Organization (3); either Sociology 5, Anthropology (3) or Sociology 105, Cultural Anthropology (3); three semester hours chosen from a social psychology group—Sociology 141, Sociology of Personality (3), Sociology 145, Social Control (3), Sociology 180, Small Group Analysis (3); and three semester hours from an applied sociology group—Sociology 111, Sociology of Occupations and Careers (3), Sociology 115, Industrial Sociology (3), Sociology 116, Military Sociology (3), Sociology 121, Population (3), Sociology 131, Introduction to Social Service (3), Sociology 147, Sociology of Law (3), Sociology 153, Juvenile Delinquency (3), Sociology 186, Sociological Theory (3).

### SPEECH MINOR

A minor of 22 semester hours is offered in speech. The minimum requirements for this minor are 12 semester hours in addition to the 10 semester hours of departmental requirements in Speech 1, 2, 3, and 4. The 12 semester hours above the departmental requirements must include 6 semester hours of courses numbered 100 or higher. All program for minors must be approved by the departmental adviser.

## PHYSICAL THERAPY

This course of study as offered by the University of Maryland is approved by the Council on Medical Education and Hospitals of the American Medical Association in collaboration with the American Physical Therapy Association and prepares the student to meet the qualifications for licensure of physical therapists.

The first two years of the curriculum are planned as studies in liberal arts and specified sciences, which are basic for courses taken in the last two years of specialization. The freshman and sophomore years are taken on the campus of the University of Maryland at College Park. The junior and senior years are taken on the campus of the University of Maryland at Baltimore, Department of Physical Therapy, School of Medicine. After completion of the senior year three additional months of supervised clinical experience are necessary in order to meet the national requirements for accreditation in this specialty. Upon the satisfactory fulfillment of the four year course a Bachelor of Science degree is awarded by the College of Physical Education, Recreation, and Health. At the satisfactory completion of the required months of clinical experience a Certificate of Proficiency in Physical Therapy is granted by the School of Medicine. For more detailed information, write to Head of the Department of Physical Therapy, School of Medicine, University of Maryland, 520 West Lombard Street, Baltimore, Maryland 21201.

# PHYSICAL THERAPY CURRICULUM

## FRESHMAN AND SOPHOMORE PROGRAM— COLLEGE PARK CAMPUS

FRESHMAN YEAR	Semester	
	I	II
Eng. 1—Composition and American Literature <sup>18</sup> .....	3	..
Phil. 1—Introduction to Philosophy <sup>18</sup> .....	..	3
(or a course in Fine Arts)		
Chem. 1, 3—General Chemistry .....	4	4
Zool. 1, 2—General Zoology, The Animal Phyla .....	4	4
Math. 10, 11—Introduction to Mathematics <sup>18</sup> .....	3	3
Speech 7, 10—Public Speaking, Group Discussion .....	2	2
P. T. 10, 11—Physical Therapy Orientation .....	0	0
P. E.—Physical Activities .....	1	1
Total .....	17	17

### SOPHOMORE YEAR

Eng. 3, 4—Composition and World Literature .....	3	3
Phys. 10, 11—Fundamentals of Physics .....	4	4
Zool. 5—Comparative Vertebrate Morphology .....	4	..
G. & P. 1—Anthropology 1, Economics 31 or 37 <sup>18</sup> .....	..	3
Psych. 1—Introduction to Psychology .....	3	..
Soc. 1—Sociology of American Life .....	..	3
P. T. 20, 21—Physical Therapy Foundations .....	1	1
Electives .....	1-3	1-3
Total .....	16-18	15-17

### JUNIOR YEAR

Anat. 103 (a) & (b)—Human Anatomy .....	5½	3
Physiol. 101—General Human Physiology .....	5	..
Path. 105—Pathology .....	..	2
P. T. 106 (a) & (b)—Professional Relation, Ethics and Clinical Observation .....	½	½
P. T. 107—Physical Therapy Theory and Technique I .....	..	2½
P. T. 108—Physical Therapy Theory and Technique II .....	..	1½
P. T. 110 (a) & (b)—Principles of Physical Therapy Applied to Medical and Surgical Conditions .....	1	1½
History—U. S. and non-U. S. History <sup>18</sup> .....	3	3
Psych. 5—Personality and Adjustment .....	3	..
Psych. 110—Educational Psychology .....	..	3
Total .....	18	18½

<sup>18</sup> Selection of appropriate courses is based on results of entrance examinations and requirements of the General Education Program.

## PHYSICAL THERAPY CURRICULUM

SENIOR YEAR	Semester	
	I	II
Psych. 161—Psychology of the Handicapped .....	1	..
P. T. 102—Physiology of Exercise .....	1	..
P. T. 104—Functional Anatomy .....	2½	..
P. T. 151—Therapeutic Exercise .....	5	..
P. T. 152—Rehabilitation .....	..	3
P. T. 153—Physical Therapy Theory and Technique III ....	3	..
P. T. 154—Interprofessional and Social Agencies Correlation ..	..	1
P. T. 156—Current Literature .....	..	1
P. T. 157—Administration and Clinical Observation .....	..	1
P. T. 158 (a) & (b)—Clinical Experience .....	1	5
P. T. 160 (a) & (b)—Principles of Physical Therapy Applied to Medical and Surgical Conditions .....	3	2
Total .....	16½	13
Clinical Experience—11 weeks, June, July and August		

## REQUIREMENTS FOR DEGREE IN PHYSICAL THERAPY

Requirements for the Bachelor of Science degree in the College of Physical Education, Recreation, and Health, major in physical therapy, are as follows:

### FRESHMAN AND SOPHOMORE PROGRAM—COLLEGE PARK CAMPUS

	Sem. Cr.
Biological Science Courses (Zool. 1, 2, 5) .....	12
Physical Science Courses (Chem. 1, 3; Phys. 10, 11) .....	16
Mathematics Courses (Math. 10, 11) .....	6
Social Science Courses (Soc. 1 or Anth. 1 or Econ. 31 or Econ. 37; G. & P. 1; Psych. 1) .....	9
English Courses (Eng. 1, 3, 4) .....	9
Philosophy or Fine Arts Course .....	3
Physical Education Courses .....	2
Speech Courses (Speech 7, 10) .....	4
Professional Courses (P. T. 10, 11, 20, 21) .....	2
Total .....	63

### JUNIOR AND SENIOR PROGRAM—BALTIMORE CAMPUS

Biological Science Courses (Anat. 103; Physiol. 101) .....	13½
Medical Science Courses (Path. 105) .....	2
Social Science Courses (Psych. 5, 110, 161) (Hist. 6 hrs.) .....	13
Professional Courses (P. T. 102, 104, 106, 107, 108, 110, 151, 152, 153, 154, 155, 156, 157, 158, 160) .....	37½
Total .....	66
Grand Total .....	129

To begin the Junior Program on the Baltimore Campus a student must have completed at least 61 academic semester hours of credit with a 2.0 average (including the courses in mathematics; physical and biological sciences) and a year of physical education.

## GRADUATE STUDY

The College of Physical Education, Recreation, and Health offers course work in the areas of physical education, recreation and health education leading to the degree of Master of Arts, Doctor of Education, and Doctor of Philosophy. Persons not interested in an advanced degree may take course work for purposes of teaching certification, renewal of certification, or professional growth. Within the three major areas—physical education, recreation, and health education—special study and research are available along the following lines: (1) Physical Education—elementary, secondary, higher education and research, administration, athletics, and dance; (2) Recreation—public and municipal, industrial, hospital, youth-serving organizations and agencies, outdoor education, camp administration, and higher education and research; (3) Health Education—elementary, secondary, higher education and research, safety education, and service organizations and agencies.

### *Special Study*

Graduate students are encouraged to pursue advanced study along lines of their special interests. The wealth of research sources close to the University make such study possible. In addition, the College of Physical Education, Recreation, and Health places at the disposal of graduate students a modern, spacious, well-equipped research laboratory.

### *General Regulations Governing Graduate Work*

Persons wishing to pursue graduate study must first gain admittance to the Graduate School. Application blanks for this purpose can be obtained by writing to the Dean of the Graduate School. Admittance to Graduate School entitles one to enroll in courses numbered 200 and above and to pursue course work leading to an advanced degree. Courses numbered 200 or above are graduate courses whereas courses numbered from 100 to 199 are advanced undergraduate and graduate courses. Persons not admitted to the Graduate School may enroll as special students in courses numbered under 200. To be admitted for graduate study, the applicant must:

- (1) be a graduate of an accredited college or university.
- (2) have a "B" average or its equivalent during the last two years of undergraduate work, or have demonstrated either at the University of Maryland or some other accredited institution the ability to do graduate level work, and
- (3) have the necessary prerequisite course work with a minimum of 16 semester credit hours in the subject field in which the applicant wishes to specialize.

## GRADUATE STUDY

### *Master of Arts Degree*

The Master of Arts degree is awarded for successful completion of a minimum of 30 hours of advanced study beyond the undergraduate level. The Master's degree represents more than mere class attendance. It represents professional competency and the demonstrated ability to do critical thinking.

The student seeking the Master of Arts degree must declare a major subject field and a minor subject field. Twelve to fifteen credit hours will be in the major area and nine to twelve hours, depending upon the number in the major area, will be in the minor field. The remaining six hours are made available to the student in order that he may study, relatively intensely, any problem or topic in which he has a *special* interest. This study culminates in a written report—thesis.

The program for the Master's degree is relatively flexible with only one course, (P.E. 210), three credit hours, being required. All other course work is elective, subject to the adviser's approval. The student, in conjunction with the help of an adviser, works out a program of study suitable to the student's special needs and interests. During the term of initial enrollment in graduate study, the student takes the Graduate Diagnostic Examination. The purpose of this examination is to help the student and adviser to discover areas of strength and weakness. This provides information needed in directing the course of study. Upon completion of all course work, including the research project, the candidate undergoes a final oral examination which is directed primarily toward the student's research.

Half-time graduate assistants working toward the Master's Degree should note that they may take only ten credit hours per semester during the fall and spring terms and six credit hours in Summer School. Consequently, a graduate assistant in order to obtain the Master's Degree, must attend the University at least three full semesters, or two semesters and two summer sessions.

### *The Doctor of Education Degree*

The Doctor of Education degree is a professional degree offered in conjunction with the College of Education. Persons who are interested primarily in administrative and teaching positions in public school and related fields are encouraged to pursue this degree.

The degree is awarded for successful completion of a minimum of 90 hours of graduate credit and a demonstrated competency in the study and solution of problems related to the student's field of endeavor.

At least 30 class hours of the minimum of 90 hours must be taken on the College Park campus. The number of hours that can be transferred from another institution is subject to the decision of the Graduate Council. Each student is expected to select and carry to successful completion a

research project of particular interest to him. This project is reported in the form of a thesis and may carry from six to nine hours of credit. In addition, each student must demonstrate his ability to translate German or French and Spanish. In pursuing the Doctor of Education degree, the candidate must select an area of major emphasis and one or two areas of minor emphasis. Each candidate must take certain graduate background tests, and must successfully pass the following academic examinations: a six-hour preliminary examination taken relatively early in the program, a final written comprehensive examination covering the entire graduate course of study, and a final oral or written examination directed primarily toward the research project.

### *The Doctor of Philosophy Degree*

The Doctor of Philosophy degree is offered primarily for those persons interested in preparing themselves for positions in teaching and research on the college and university level. A *minimum* of 90 credit hours is required for this degree, plus the demonstrated ability to do scholarly work and research. At least thirty of the 90 hours must be taken on the College Park campus and the amount of credit that can be transferred from other institutions is subject to the decision of the Graduate Council. Each student must select and carry to completion a research project which may carry from 12 to 18 hours of credit. Course work must be planned on the basis of a major subject field and one or two closely related minor subject fields. In addition to class work, the student must demonstrate a reading proficiency in German and French or Spanish, and also successfully pass two examinations: (1) a comprehensive written and oral preliminary examination, and (2) a final oral and/or written examination.

### *Doctoral Residence*

The requirements of residency for both the Ed. D. and Ph. D. candidates can be fulfilled by presence on the campus for two semesters during the fall and spring terms. In unusual circumstances, the time may be prorated over more than two semesters.

### *General Advanced Study*

Students who are not seeking a degree, but are doing advanced study to fulfill some special need or renewal of teaching certification, are encouraged to select an adviser and to plan a program designed to help them best achieve their objectives.

### *Prerequisites for Advanced Study*

The course prerequisite for advanced study in each of the three areas, physical education, recreation, and health are listed below. In certain instances experience or equivalent courses may be substituted for the courses listed. Students who are deficient in only one or two subjects

## GRADUATE STUDY

may be admitted on a provisional basis, with the understanding that the deficiencies will be made up as soon as possible.

The following courses, or their equivalents, are prerequisites for advanced study:

- A. Physical Education—human anatomy, physiology, history and principles of physical education, theory of exercise (physiology of exercise), kinesiology, adapted physical education, measurement, methods, activity skills, administration, practice teaching (teaching experience), and human development (educational psychology).

Note: Courses shown in the brackets above are the equivalents of the courses after which they are shown. Measurement, administration, kinesiology and theory of exercise may be taken for graduate credit if they have not been taken on the undergraduate level. The student is expected to carry out a special research project if an advanced undergraduate course (100 level), is to carry graduate credit.

- B. Recreation—psychology, sociology, principles of recreation, administration, basic sciences, recreational skills laboratory, and practical experience.
- C. Health Education—biological sciences, bacteriology, human anatomy, physiology, chemistry, psychology, measurement, administration, principles of health, and field work.

### *Graduate Assistantships*

A number of teaching and research assistantships are available to qualified individuals. These assistantships carry a stipend of \$2,000 for the academic year, and exemption from all fixed charges. Graduate assistants may carry up to ten hours of academic work. Persons interested in an assistantship should write directly to Dean L. M. Fraley, College of Physical Education, Recreation, and Health.

Persons interested in additional information concerning the graduate program should refer to the Graduate School Announcements.

# Course Offerings

The University reserves the right to withdraw or discontinue any course for which an insufficient number of students have registered to warrant giving the course. In such an event, no fee will be charged for transfer to another course.

Courses are designated by numbers as follows:

1 to 99: courses for undergraduates.

100 to 199: courses for advanced undergraduates and graduates.

200 to 299: courses for graduates only.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his program. Students obtain these schedules when they register.

Physical education fee per semester (to be charged any student enrolled in any physical activity course), \$6.00.

## PHYSICAL EDUCATION

### P. E. 30. INTRODUCTION TO PHYSICAL EDUCATION, RECREATION, AND HEALTH. (2)

First and second semesters. Development of understanding and appreciation of the historic and significant purpose and place of each of the specialized areas in general education. A study of the educational and personal requirements and opportunities of a career in each professional area. Students will become acquainted with the status and trends of each area.

### P. E. 40w FUNDAMENTALS OF MOVEMENT (2)

First and second semester—three hours a week. Introduction to analysis of muscular activity; conditioning exercises and programs; improvement of physical fitness; mechanical principles related to sports activities.

### P. E. 50 RHYTHMIC ACTIVITIES (2)

First and second semester. Lab. fee, \$6.00—three hours a week. Development of rhythmic sensitivity through an analysis of rhythm and its application to movement, skills in folk, square and social dance, teaching techniques for use in schools and recreational programs.

### P. E. 55. ELEMENTARY SCHOOL RHYTHMIC ACTIVITIES. (2)

First and second semesters. Summer session. This course surveys the various types of rhythmic activities suitable for use in the elementary school. Basic rhythms, singing games, and folk and square dancing are considered in terms of their use at the various grade levels as well as the best accepted methods of teaching these activities.

## PHYSICAL EDUCATION

### P. E. 57. ELEMENTARY SCHOOL SKILLS AND SELF-TESTING ACTIVITIES. (2)

First and second semesters and summer. This course surveys the various types of skills and stunt and tumbling activities suitable for use in the elementary school. These activities are considered in terms of their use at the various grade levels as well as the best accepted methods of teaching.

### P. E. 61, 63. SKILLS LABORATORY. (2, 2)

First and second semesters. Six hours a week. Laboratory fee, \$6.00. Progressive techniques and practice of skills in apparatus, calisthenics, cross-country, dual recreation activities, mass games and relays, soccer, touch football, track, tumbling, and volleyball.

### P. E. 62, 64. SKILLS LABORATORY. (2, 2)

First and second semesters. Six hours a week. Laboratory fee, \$6.00. Progressive techniques and practice of seasonal sports, stunts, tumbling, and gymnastic exercises.

### P. E. 65, 67. SKILLS LABORATORY. (2, 2)

First and second semesters. Six hours a week. Laboratory fee, \$6.00. Progressive techniques and practice of skills in basketball, baseball, football and wrestling.

### P. E. 66, 68. SKILLS LABORATORY. (2, 2)

First and second semesters. Six hours a week. Prerequisites, P. E. 40, 62, 64. Laboratory fee, \$6.00. Techniques of selected team and individual sports.

### P. E. 69. SKILLS LABORATORY. (2)

First and second semesters. Three hours a week. Laboratory fee, \$6.00. Prerequisite, P. E. 61. Provides experience in complex gymnastic activities above the elementary phase.

### P. E. 71. ELEMENTARY SWIMMING. (1)

First and second semesters. Laboratory fee, \$6.00. Progressive techniques and practice of elementary swimming. Course includes basic and intermediate swimming instruction.

### P. E. 72w. ELEMENTARY SWIMMING AND DIVING. (1)

First and second semesters. Three hours a week. Laboratory fee, \$6.00. Progressive techniques and practice in the elementary phase of swimming and diving, designed to make the student self-sufficient in deep water.

### P. E. 73. ADVANCED SWIMMING. (1)

First and second semesters. Prerequisite, P. E. 71, or equivalent. Laboratory fee, \$6.00. Progressive techniques and practice of advanced swimming skills, water stunts and survival swimming.

### P. E. 74w. INTERMEDIATE SWIMMING AND DIVING. (1)

First and second semesters. Three hours a week. Prerequisite, P. E. 72, or equivalent. Laboratory fee, \$6.00. Continuation of the techniques in P. E. 72 to include proficiency in the standard swimming strokes and the ability to perform a fully coordinated standing dive.

### P. E. 75. LIFE SAVING AND WATER SAFETY. (1)

First and second semesters. Three hours a week. Prerequisites, P. E. 73, or equivalent. Laboratory fee, \$6.00. Progressive techniques and practice of life saving and water safety skills. Course includes the Senior Life Saving material of the American Red Cross and the Y.M.C.A. It is possible to secure the American Red Cross Water Safety Instructorship through this course.

- P. E. 76w. **ADVANCED SWIMMING AND LIFE SAVING.** (1)  
First and second semester—three hours a week. Prerequisite, P. E. 74 or equivalent. American Red Cross Senior Life Saving, advanced swimming strokes, and diving.
- P. E. 77mw. **METHODS OF AQUATICS.** (2)  
First and second semesters. Three hours a week. Prerequisites, P. E. 73, or equivalent. Laboratory fee, \$6.00. This course is designed to train students for aquatic leadership in schools, camps and clubs. Course includes teaching methods, administration, facilities and equipment.
- P. E. 78w. **WATER SAFETY.** (1)  
First and second semester—three hours a week. Prerequisites, Current American Red Cross Senior Life Saving certificate, or successful completion of P. E. 76 or equivalent. This course is designed to prepare students to teach swimming and life saving and enable students to secure the American Red Cross Water Safety Instructorship.
- P. E. 79. **FANCY DIVING.** (1)  
First and second semesters. Three hours a week. Laboratory fee, \$6.00. Progressive techniques and practice of fancy diving. Course will include work on the five categories of dives.
- P. E. 82w. **ORGANIZATION AND ADMINISTRATION OF INTRAMURALS.** (1)  
First and second semester—three hours a week. Organization and administration of intramural programs, tournaments, techniques of officiating women's sports. Opportunity to qualify for officials' ratings in hockey and basketball.

*For Advanced Undergraduates and Graduates*<sup>19</sup>

- P. E. 100. **KINESIOLOGY.** (4)<sup>19</sup>  
First and second semesters. Summer session. Three lectures and two laboratory hours a week. Prerequisites, Zool. 1, 14, and 15, or the equivalent. The study of human movement and the physical and physiological principles upon which it depends. Body mechanics, posture, motor efficiency, sports, the performance of atypical individuals, and the influence of growth and development upon motor performance are studied.
- P. E. 101, 103. **ORGANIZATION AND OFFICIATING IN INTRAMURALS.** (1, 1)  
First and second semesters. Six hours a week. Organizations, administration, and promotion of intramurals at various school levels. Types of tournaments, units of competition, handling of student leader personnel, etc.
- P. E. 105, 107. **SKILLS LABORATORY.** (2, 2)  
First and second semesters. Four hours a week. Laboratory fee, \$6.00. Prerequisite, junior standing. Open to male students preparing for teaching. Experience in individual and dual neuro-muscular sports skills for the physical education major student.

---

<sup>19</sup>This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## PHYSICAL EDUCATION

### P. E. 114. METHODS IN PHYSICAL EDUCATION FOR SECONDARY SCHOOLS. (4)

First and second semesters. Three lectures and a lab. each week. Application of educational philosophy and principles to class organization and teaching techniques in individual sports, recreational games, gymnastics, body mechanics, and dance for junior and senior high school programs.

### P. E. 115. METHODS AND MATERIALS FOR SECONDARY SCHOOLS. (1)

Second semester. Three laboratory hours per week arranged. Prerequisite, P. E. 113. This is a laboratory course designed to help the student acquire practical experience in the courses of the University required program. The student will be given the opportunity to observe and assist in teaching under the direct supervision of a regular staff member.

### P. E. 120. PHYSICAL EDUCATION FOR THE ELEMENTARY SCHOOL. (3)<sup>20</sup>

First and second semesters. Summer session. This course is designed to orient the general elementary teacher to physical education. Principles and practices in elementary physical education will be presented and discussed and a variety of appropriate activities will be considered from the standpoint of their use at the various grade levels.

### P. E. 123, 125, 126. COACHING ATHLETICS. (2, 2, 2)

First and second semesters. Two lectures and two laboratory hours a week. Theory of coaching the various competitive sports commonly found in high school and college programs.

### P. E. 124W. COACHING ATHLETICS. (2)

First and second semester—three hours a week. Theory and practice of coaching competitive sports found in high school and community recreational programs.

### P. E. 130. FUNDAMENTALS OF BODY DYNAMICS. (3)

First and second semesters. Summer session. This course is designed to acquaint the elementary teacher with the scientific principles of mechanical-anatomical analysis and physiology of activities as they relate to physical growth and development.

### P. E. 133. ADAPTED PHYSICAL EDUCATION. (2)

First and second semesters. Lecture and lab. Prerequisites, P. E. 100 Kinesiology or equivalent. Application for kinesiological and physiological principles to handicapped students; designed to help prospective teachers meet exercise needs of those pupils with disabilities which require special handling.

### P. E. 135. COACHING SWIMMING AND DIVING. (2)

First and second semesters. Three hours a week. Laboratory fee, \$6.00. A thorough analysis of the techniques of coaching swimming and diving. Course includes a systematic treatment of the philosophy, historical development and psychological theories of coaching aquatics.

### P. E. 155. PHYSICAL FITNESS OF THE INDIVIDUAL. (3)<sup>20</sup>

First and second semesters. Summer session. A study of the major physical fitness problems confronting the adult in modern society. Consideration is given to the scientific appraisal, development and maintenance of fitness at all

---

<sup>20</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. This course is open to persons outside the fields of Physical Education and Health.

**P. E. 160. THEORY OF EXERCISE. (3)<sup>21</sup>**

First and second semesters. Summer session. Two lectures and two laboratory hours a week. Prerequisite, Zool. 1, 14, and 15, and P. E. 100 or the equivalent. A study of exercise and its physiological and kinesiological bases. Special emphasis is placed upon the application of exercise to the development and maintenance of physical efficiency. Corrective therapy, conditioning for athletics, the effects of exercise and training on the human organism, fatigue, staleness, relaxation, and the nature of athletic injuries are investigated.

**P. E. 170. SUPERVISION IN ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)<sup>21</sup>**

First and second semesters. Summer session. Prerequisite, P. E. 120. Principles and techniques of supervision are studied from a standpoint of their application in improving the learning situation in elementary school physical education. Strong emphasis will be given to the concept that modern supervision in elementary school physical education should be based on the application of fundamental democratic principles.

**P. E. 180. MEASUREMENT IN PHYSICAL EDUCATION AND HEALTH. (3)<sup>21</sup>**

First and second semesters. Summer session. Two lectures and two laboratory periods a week. Prerequisite, placement in Group 1 or 2 on Mathematics Entrance test or Math. 0. The application of the principles and techniques of educational measurement to the teaching of health and physical education; study of the functions and techniques of measurement in the evaluation of student progress toward the objectives of health and physical education, and in the evaluation of the effectiveness of teaching.

**P. E. 181. ADVANCED TRAINING AND CONDITIONING. (3)**

Second semester. Two lectures and two laboratory hours a week. Prerequisites, Zool. 14, 15 and P. E. 100. The training and physical conditioning of athletics. Treatment of athletic injuries by taping, massage, hydro-therapy, physical therapy, and electro-therapy. Remedial and conditioning exercises. Theory and practice.

**P. E. 187. PHYSICAL EDUCATION AND SPORT IN CONTEMPORARY CULTURES. (3)<sup>21</sup>**

First and second semesters. Prerequisite, Soc. 1 or Soc. 5 or equivalent. Three lectures per week. A study will be made of the cultural impact of physical education activities in the United States and selected countries. Individual research on selected topics will be required.

**P. E. 189. FIELD LABORATORY PROJECTS AND WORKSHOP. (1-6)<sup>21</sup>**

First and second semesters. Summer session. A course designed to meet the needs of persons in the field with respect to workshops and research projects in special areas of knowledge not covered by regularly structured courses.

Note: The maximum total number of credits that may be earned toward any degree in Physical Education, Recreation, or Health Education under P. E., Rec., Hea., or Ed. 189 is six.

<sup>21</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## PHYSICAL EDUCATION

### P. E. 190. ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION, AND HEALTH. (3)<sup>22</sup>

First and second semesters. Summer session. The application of the principles of administration and supervision to Physical Education, Recreation, and Health. This course must be taken during the semester in which the student is doing student teaching.

### P. E. 191. THE CURRICULUM IN ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)<sup>22</sup>

First and second semesters. One lecture and two laboratory hours per week. Techniques planning and construction is considered from a standpoint of valid criteria for the selection of content in elementary school physical education. Desirable features of cooperative curriculum planning in providing for learning experiences will be presented and discussed.

### P. E. 193. HISTORY AND PHILOSOPHY OF SPORT AND PHYSICAL EDUCATION. (3)<sup>22</sup>

First and second semesters. History and philosophical implications of sport and physical education through ancient medieval, and contemporary periods in western civilization.

### P. E. 195. ORGANIZATION AND ADMINISTRATION OF ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)<sup>22</sup>

First and second semesters. Summer session. Prerequisite, P. E. 120. This course considers the procedures which are basic to the satisfactory organization of all phases of the elementary school physical education program. Stress will be placed on the organizational and administrative factors necessary for the successful operation of the program in various types of elementary schools. Strong emphasis will be placed on organization and administration from a standpoint of adapting the program to specific situations.

### P. E. 196. QUANTITATIVE METHODS. (3)<sup>22</sup>

First and second semesters. Summer session. A course covering the statistical techniques most frequently used in research pertaining to Physical Education, Recreation, and Health Education. An effort will be made to provide the student with the necessary skills, and to acquaint him with the interpretations and practical applications of these techniques.

### *For Graduates*

### P. E. 200. SEMINAR IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (1)

First and second semesters. Summer session.

### P. E. 201. FOUNDATIONS IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Summer session. A study of history, philosophy and principles of physical education, recreation and health as applied to current problems in each area and as related to general education.

---

<sup>22</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

**P. E. 202. STATUS AND TRENDS IN ELEMENTARY SCHOOL PHYSICAL EDUCATION. (3)**

First and second semesters. Summer session. An analysis of the current status and implications for future trends in physical education at the elementary school level. Open to experienced persons in all phases of education.

**P. E. 203. SUPERVISORY TECHNIQUES IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)**

First and second semesters. Summer session. A study of current concepts, principles and techniques of supervision and of their application to the special fields indicated; observation of available supervisory programs and visits with local supervisors; practice in the use of selected techniques.

**P. E. 204. PHYSICAL EDUCATION AND THE DEVELOPMENT OF THE CHILD. (3)**

First and second semesters. Summer session. An analysis of the place of physical education in meeting the growth and developmental needs of children of elementary school age.

**P. E. 205. ANALYSIS OF CONTEMPORARY ATHLETICS. (3)**

First and second semesters. Summer session. A study of current problems, practices and national issues of permanent importance to the conduct of athletic competition in a democracy.

**P. E. 210. METHODS AND TECHNIQUES OF RESEARCH. (3)**

First and second semesters. Summer session. A study of methods and techniques of research used in Physical Education, Recreation, and Health Education; an analysis of examples of their use; and practice in their application to problems of interest to the student.

**P. E. 215. PRINCIPLES AND TECHNIQUES OF EVALUATION. (3)**

First and second semesters. Summer session. Prerequisite, an introductory course in measurement or permission of the instructor. A study of currently used means of evaluating the performance of students and the effectiveness of programs of physical education in schools and colleges. Specific problems concerning evaluation, brought in by members of the class, will be analyzed.

**P. E. 230. SOURCE MATERIAL SURVEY. (3)**

First and second semesters. Summer session. A library survey course, covering the total areas of Physical Education, Recreation, and Health, plus research in one specific limited problem of which a digest, including a bibliography, is to be submitted.

**P. E. 250. MENTAL AND EMOTIONAL ASPECTS OF SPORTS AND RECREATION. (3)**

First and second semesters. Summer session. Prerequisites, psychology and/or human development. An exploration of psychological aspects of physical education, sports and recreation, including personality dynamics in relation to exercise and sports, psychological factors in athletic performance and coaching, and applications of principles of motor learning.

**P. E. 275. ADVANCED ANALYSIS OF HUMAN MOTION. (3)**

First and second semesters. Summer session. Prerequisites, P. E. 100, 160, College algebra or equivalent or by permission of instructor. A research oriented

## PHYSICAL EDUCATION

kinesiological analysis of human movement as it relates to sports and the activities of daily living. The analysis is accomplished by means of various measurement procedures including cinematography, electronic timing devices and similar instruments.

### P. E. 280. SCIENTIFIC BASES OF EXERCISE. (3)

First and second semesters. Summer session. Prerequisites, Anatomy, Physiology, P. E. 100, 160, or equivalent. A critical analysis of the role of physical exercise in modern society with attention given to such topics as: the need for physical exercise, its chronic effects, the role of exercise in attaining good physical condition and fitness, factors determining championship performances, and physical fatigue.

### P. E. 287. ADVANCED SEMINAR. (1-2)

First and second semesters. Summer session. Prerequisite, P. E. 201, or Hea. 220, or equivalent, or permission of the instructor. This course is a study of the current problems and trends in the selected fields of Physical Education, Recreation, and Health.

### P. E. 288. SPECIAL PROBLEMS IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (1-6)

First and second semesters. Summer session. Master or doctoral candidates who desire to pursue special research problems under the direction of their advisors may register for 1-6 hours of credit under this number.

### P. E. 290. ADMINISTRATIVE DIRECTION OF PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Summer session. This course is devoted to the analysis of administrative problems in the light of sound educational practice. Students concentrate their efforts upon their own on-the-job administrative problems and contribute to the solution of other class members' problems.

### P. E. 291. CURRICULUM CONSTRUCTION IN PHYSICAL EDUCATION AND HEALTH. (3)

First and second semesters. Summer session. A study of the principles underlying curriculum construction in Physical Education and Health Education and the practical application of these principles to the construction of a curriculum for a specific situation. The specific content of this course is adjusted to meet the needs of the students enrolled in it.

### P. E. 399. RESEARCH—THESIS. (1-5)

First and second semesters. Summer session. Students who desire credits for a master's thesis, a doctoral dissertation, or a doctoral project should use this number.

## RECREATION

### REC. 10, 11. RECREATION ORIENTATION. (0, 0)

First and second semesters. Through occasional class sessions and attendance at various meetings on and off campus, those majoring in recreation will have an opportunity to become acquainted with their fellow students, with the organizations in the field, their leaders and activities, and with the broad scope of recreation and its various divisions and interests.

**REC. 30. HISTORY AND INTRODUCTION TO RECREATION. (2)**

First and second semesters. An introduction to the beginnings, growth, and possibilities in recreation as presently fostered by individuals, agencies and governments; attitudes toward and theories of play; historical events and figures; present principles and objectives; organizations and groups interested in recreation, and their relationships; job opportunities, specifications and demands; self analysis of individual student interests, limitations and capabilities in light of these specifications and demands.

**REC. 40. CAMP COUNSELING AND ADMINISTRATION. (2)**

First and second semesters. A study of the philosophy and techniques of camp counseling including the qualifications, responsibilities and skills involved; the basic organization, administration and program planning practices and problems of camping as a whole; the relationship of these practices and problems to the counselor and his or her probable success. Outdoor skills will be taught and practiced insofar as possible.

*For Advanced Undergraduates and Graduates*<sup>23</sup>**REC. 100. CO-RECREATIONAL GAMES AND PROGRAMS. (2)**

First and second semesters. Summer session. Compilation and sampling of the techniques for use in low organization and party games and activities. Emphasis is placed upon those activities of value to a recreation leader or teacher, and upon the placement, sequence and variation of such activities for all age levels and interests.

**REC. 110. NATURE LORE. (1-2)**

Second semester. An overall orientation course conducted in conjunction with the National Park Service of Washington, D.C., and covering various areas of physical and biological sciences; rocks, trees, animals, birds, flowers, etc. Two credits will be granted those students completing the maximum requirements of the course including local evening lectures, Saturday and/or Sunday observations, the Saturday Outdoor Leadership Workshop (24 hours), and periodic class meetings held at the University of Maryland.

**REC. 120. PROGRAM PLANNING. (3)**<sup>23</sup>

First and second semesters. Prerequisite, Rec. 30 or 170. Study of the various aspects, problems and practices of family, agency and governmental recreation programs and their planning, with particular emphasis on playground-community and teen-age center plans and procedures. This course should be of interest and value to those students planning to do part-time summer playground work.

**REC. 140. OBSERVATION AND FIELD WORK IN RECREATION. (5)**

First and second semesters. Included are observation and field work at several of the facilities available; particular emphasis will be placed on whatever observations may be needed to complete coverage of the various opportunities; field work opportunities themselves will be selected and assigned on the basis of student interest and future job plans.

<sup>23</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## RECREATION

### REC. 230. SOURCE MATERIAL SURVEY. (3)

First and second semesters. Summer session. A library survey course, covering the total areas of Physical Education, Recreation, and Health, plus research in one specific limited problem of which a digest, including a bibliography, is to be submitted.

### REC. 240. INDUSTRIAL RECREATION. (3)

First and second semesters. Summer session. An introductory study of the philosophy of and practices and problems in industrial recreation. Where possible the course will include opportunities for observation and visiting specialists.

### REC. 260. HOSPITAL RECREATION. (3)

First and second semesters. Summer session. An introductory study of the philosophy of and practices in hospital and institutional recreation. Where possible the course will include opportunities for observation and visiting specialists.

### REC. 287. ADVANCED SEMINAR. (1-2)

First and second semesters. Summer session. Prerequisites, P. E. 201, Hea. 201, Rec. 201, or Hea. 220, or permission of the instructor. This course is a study of the current problems and trends in the selected fields of physical education, recreation and health education.

### REC. 288. SPECIAL PROBLEMS IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (1-6)

First and second semesters. Summer session. Master or doctoral candidates who desire to pursue special research problems under the direction of their advisers may register for 1-6 hours of credit under this number.

### REC. 290. ADMINISTRATIVE DIRECTION OF PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Summer session. This course is devoted to the analysis of administrative problems in the light of sound educational practice. Students concentrate their efforts upon their own on-the-job administrative problems and contribute to the solution of other class members' problems.

### REC. 399. RESEARCH—THESIS. (1-5)

First and second semesters. Summer session. Students who desire credits for a master's thesis, a doctoral dissertation, or doctoral projects should use this number.

## HEALTH EDUCATION

### HEA. 10. ORIENTATION TO HEALTH EDUCATION. (1)

First and second semesters. This course explores the field of health education in both the school and the community from the point of view of the health educator. Professional preparation and career opportunities are considered.

### HEA. 30. INTRODUCTION TO PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Development of understanding and appreciation of the historic and significant purpose and place of each of the specialized areas in general education. A study of the educational and personal requirements and opportunities of a career in each professional area. Students will be acquainted with the status and trends of each area.

**HEA. 40. PERSONAL AND COMMUNITY HEALTH. (3)**

First and second semesters. Meaning and significance of physical, mental and social health as related to the individual and to society; important phases of national health problems; constructive methods of promoting health of the individual and the community; health problems of college students and young people with special emphasis on health knowledge for the future teacher.

**HEA. 50. FIRST AID AND SAFETY. (1)**

First and second semesters. Standard and Advanced American Red Cross courses in first aid; safety in physical activities.

**HEA. 60. ADVANCED FIRST AID. (2)**

First and second semesters. Opportunity to secure Red Cross Advanced and Instructor's Certificate.

**HEA. 70. SAFETY EDUCATION. (3)**

First and second semesters. A study of the causes of accidents and methods of prevention, including principles of traffic and industrial safety.

**HEA. 80. THE DRIVER, HIS CHARACTERISTICS AND IMPROVEMENT. (3)**

First and second semesters. Summer session. Prerequisites, Hea. 50. The aim of this study is to treat the driver-behavior problem in its relation to many of the psycho-physical factors and forces in the traffic environment that impinge upon the man behind the wheel.

*For Advanced Undergraduates and Graduates<sup>28</sup>*

**HEA. 105. BASIC DRIVER EDUCATION. (3)**

First and second semesters. Summer session. Prerequisites, Hea. 50, 60, 70, 80. This course is a study of the place of the automobile in modern life and deals with the theory and practice of the following: traffic accidents and other traffic problems; objectives and scope of driver-education; motor vehicle laws and regulations; basic automobile construction and maintenance from the standpoint of safety, methods in classroom instruction; aids to learning and practice driving instruction.

**HEA. 110. INTRODUCTION TO SCHOOL HEALTH EDUCATION. (2)**

Second semester. Summer session. Prerequisites, Hea. 2 and 4, or Hea. 40. This course deals with many aspects of school and community health programs, and the backgrounds and history of the services studied with their relationships to each other directly and indirectly. Various phases of healthful living are discussed as a part of school and community health. Special emphasis is placed upon the health service of both programs.

**HEA. 120. METHODS AND MATERIALS IN HEALTH EDUCATION. (3)**

First semester. Prerequisite, Hea. 40 or equivalent. This course considers various plans of teaching health in schools and elsewhere. Health education teaching methods and materials are evaluated with regard to their application to practical situations.

**HEA. 140. CURRICULUM, INSTRUCTION AND OBSERVATION. (3)**

First and second semesters. Summer session. Prerequisites, Hea. 40, 110, 120. A course designed to provide directed observation and discussion, coordinating these experiences with those from previous methods courses in the development of

<sup>28</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## HEALTH EDUCATION

curricula for health and physical education. The course is planned to prepare for student teaching which follows in the same semester. The observations will be made of health and physical education programs in junior and senior high schools. This course must be taken during the semester in which the student is doing teaching.

### HEA. 145. ADVANCED DRIVER EDUCATION. (3)

First and second semesters. Summer session. Prerequisites, Hea. 50, 60, 70, 80, 105. Progressive techniques, supervision, and practice of advanced driver-education; comprehensive programming for traffic safety; psychology of traffic safety; improving the attitudes of young drivers; teaching to meet driving emergencies; program planning in driver-education; consumer education; resources and agencies; the teacher and driver-education; measuring and evaluating results; driver-education for adults; new developments in driver-education; insurance and liability, and the future of driver-education.

### HEA. 150. HEALTH PROBLEMS OF CHILDREN AND YOUTH. (3)<sup>27</sup>

First and second semesters. Summer session. This course involves a study of the health needs and problems of pupils from the primary grades through high school. Physical, mental, and psychosomatic aspects of health are considered in relation to the developmental and school levels. Consideration is given to such topics as diet selection and control; exercise, recreation and rest; emotional upset and its implications; and psychosexual development and problems. The role of the teacher and parent in encouraging optimal health is emphasized.

### HEA. 155. PHYSICAL FITNESS OF THE INDIVIDUAL. (3)<sup>27</sup>

First and second semesters. Summer session. A study of the major physical fitness problems confronting the adult in modern society. Consideration is given to the scientific appraisal, development and maintenance of fitness at all age levels. Such problems as obesity, weight reduction, chronic fatigue, posture, and special exercise programs are explored. This course is open to persons outside the fields of Physical Education and Health.

### HEA. 160. PROBLEMS IN SCHOOL HEALTH EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS. (2-6)<sup>27</sup>

First and second semesters. Summer session. This is a workshop type course designed particularly for in-service teachers to acquaint them with the best methods of providing good health services, healthful environment and health instruction.

### HEA. 165. ORGANIZATION, ADMINISTRATION AND SUPERVISION OF SCHOOL SAFETY EDUCATION. (3)

First and second semesters. Summer Session. Prerequisite, Hea. 70. Designed for teachers, school administrators, college instructors and others responsible for directing or supervising safety programs in the schools. Deals with the problems, policies, practices and procedures involved in the organization, administration and the supervision of a comprehensive accident prevention and safety education program for the schools. Considers integration factors of the school safety programs with the special emphasis on traffic programs.

### HEA. 170. THE HEALTH PROGRAM IN THE ELEMENTARY SCHOOL. (3)<sup>27</sup>

First and second semesters. Summer session. Prerequisites, Hea. 2 and 4 or Hea.

---

<sup>27</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

40. This course, designed for the elementary school classroom teacher, analyzes biological, sociological, nutritional and other factors which determine the health status and needs of the individual elementary school child. The various aspects of the school program are evaluated in terms of their role in health education. The total school health program is surveyed from the standpoint of organizing and administration, and health appraisal. Emphasis is placed upon modern methods and current materials in health instruction. (The State Department of Education accepts this course for biological science credit.)

**HEA. 175. PROBLEMS IN DRIVER AND TRAFFIC SAFETY EDUCATION. (3)**

First and second semesters. Summer session. Prerequisite, Hea. 145. An advanced course which gives consideration to the individual problems encountered in teaching driver and safety education. The psychology of teaching and learning are emphasized; and consideration is given to the implications of emotion and attitude factors in driver and traffic education. The course includes an examination of existing courses of study, research and supervisory and evaluated practices.

**HEA. 178. FUNDAMENTALS OF SEX EDUCATION. (3)<sup>28</sup>**

This course is concerned with basic information regarding the physical, psychological, social, historical, semantic and comparative cultural aspects of sex. The adjustment needs and problems of children and adults during the course of maturing and aging are studied; and special consideration is given to the sex education program in schools.

**HEA. 180. MEASUREMENT IN PHYSICAL EDUCATION AND HEALTH. (3)<sup>28</sup>**

First and second semesters. Summer session. Two lectures and two laboratory periods per week. The application of the principles and techniques of educational measurement to the teaching of health and physical education; study of functions and techniques of measurements in the evaluation of student progress toward the objectives of health and physical education, and in the evaluation of the effectiveness of teaching.

**HEA. 188. CHILDREN'S REMEDIAL FITNESS CLINIC. (1-4)**

First and second semesters. Summer session. Prerequisite, at least junior standing in health, physical education and recreation, or by special permission of the director. An opportunity to acquire training and experience in a therapeutically oriented physical education-recreation program for children referred by various education, special education, medical and psychiatric groups.

**HEA. 189. FIELD LABORATORY PROJECTS AND WORKSHOP. (1-6)<sup>28</sup>**

First and second semesters. Summer session. A course designed to meet the needs of persons in the field with respect to workshop and research projects in special areas of knowledge not covered by regularly structured courses.

Note: The maximum total number of credits that may be earned toward any degree in physical education, recreation, or health education under P. E., Rec., Hea., or Ed. 189 is six.

**HEA. 190. ADMINISTRATION AND SUPERVISION OF SCHOOL HEALTH EDUCATION. (3)<sup>28</sup>**

First and second semesters. Summer session. The application of the principles of administration and supervision to school health education. This course involves observation and field work in school and community health programs.

<sup>28</sup> This course may be taken for graduate credit with the permission of the adviser. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## HEALTH EDUCATION

### *For Graduates*

#### HEA. 200. SEMINAR IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (1)

First and second semesters. Summer session.

#### HEA. 201. FOUNDATIONS IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Summer session. A study of history, philosophy and principles of physical education, recreation and health as applied to current problems in each area and as related to general education.

#### HEA. 203. SUPERVISORY TECHNIQUES IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)

First and second semesters. Summer session. A study of current concepts, principles and techniques of supervision and of their application to the special fields indicated; observation of available supervisory programs and visits with local supervisors; practice in the use of selected techniques.

#### HEA. 210. METHODS AND TECHNIQUES OF RESEARCH. (3)

First and second semesters. Summer session. A study of methods and techniques of research used in physical education, recreation and health education; an analysis of examples for their use; and practice in their application to problems of interest to the student.

#### HEA. 220. SCIENTIFIC FOUNDATIONS OF HEALTH EDUCATION. (3)

First and second semesters. Summer session. A course dealing with an analysis of hereditary, physical, mental, and social factors which influence the total health status during the developmental process. The role of education in fostering physical and mental health is studied.

#### HEA. 230. SOURCE MATERIAL SURVEY. (3)

First and second semesters. Summer session. A library survey course, covering the total areas of physical education, recreation and health, plus research in one specific limited problem of which a digest, including a bibliography, is to be submitted.

#### HEA. 240. MODERN THEORIES OF HEALTH. (3)

First and second semesters. Summer session. The purpose of this course is to familiarize advanced students in health education with modern theories of health and disease which involve so-called mind-body relationships. Major topics of study and analysis include the theories of psychosomatics, stress, hypnosis and constitutional psychology.

#### HEA. 250. HEALTH PROBLEMS IN GUIDANCE. (3)

First and second semesters. Summer session. A course designed to familiarize guidance counselors with principles of health and with common deviations from health, especially during the school years. Implications of health for pupil effectiveness in the entire curriculum, including extra-class activities, are dealt with. Special attention is given to psychosomatic disturbances which are commonly an aspect of personal problem situations. Methods of dealing with health problems and utilizing available resources of school and community are discussed.

#### HEA. 260. PUBLIC HEALTH EDUCATION. (3)

First and second semesters. Summer session. A course designed to acquaint the student with the structure, functions and major problems in public health; and with the role of education in public health.

**HEA. 270. STATUS AND TRENDS IN HEALTH EDUCATION. (3)**

First and second semesters. Summer session. This course is concerned with analyzing the current status and implications for future trends in the various areas of health education.

**HEA. 280. THE SCIENTIFIC BASES OF EXERCISE. (3)**

First and second semesters. Summer session. Prerequisites, anatomy, physiology, P. E. 100, P. E. 160, or the equivalent. A critical analysis of the role of physical exercise in modern society with attention given to such topics as: the need for physical exercise, its chronic effects, the role of exercise in attaining good physical condition and fitness, factors determining championship performances, and physical fatigue.

**HEA. 287. ADVANCED SEMINAR. (1-2)**

First and second semesters. Summer session. Prerequisites, P. E. 201, Hea. 201, Rec. 201, or Hea. 220, or permission of the instructor. This course is a study of the current problems and trends in the selected field of physical education, recreation and health education.

**HEA. 288. SPECIAL PROBLEMS IN PHYSICAL EDUCATION, RECREATION, AND HEALTH. (1-6)**

First and second semesters. Summer session. Master or doctoral candidates who desire to pursue special research problems under the direction of their advisors may register for 1-6 hours of credit under this number.

**HEA. 290. ADMINISTRATIVE DIRECTION OF PHYSICAL EDUCATION, RECREATION, AND HEALTH. (3)**

First and second semesters and summer. This course is devoted to the analysis of administration problems in the light of sound educational practice. Students concentrate their efforts upon their own on-the-job administrative problems and contribute to the solution of other class members' problems.

**HEA. 291. CURRICULUM CONSTRUCTION IN PHYSICAL EDUCATION AND HEALTH. (3)**

First and second semesters and summer. A study of the principles underlying curriculum construction in Physical Education and Health Education and the practical application of these principles to the construction of a curriculum for a specific situation. The specific content of this course is adjusted to meet the needs of the students enrolled in it.

**HEA. 399. RESEARCH—THESIS. (1-5)**

First and second semesters and summer. Students who desire credit for a master's thesis, doctoral dissertation, or a doctoral project should use this number.

## PHYSICAL THERAPY

### COLLEGE PARK CAMPUS

**P. T. 10, 11. PHYSICAL THERAPY ORIENTATION. (0, 0)**

First and second semesters. General introductory course to the professional field of physical therapy. Field trips to physical therapy departments in government and private agencies. Orientation of the student to job opportunities with their specifications and demands; self analysis of the students' capabilities and the major curriculum in light of such specifications and demands.

## PHYSICAL THERAPY

### P. T. 20, 21. FOUNDATIONS OF PHYSICAL THERAPY. (1, 1)

First and second semesters. Introduction to the development, growth and functions of physical therapy and rehabilitation. A study of the national organization and the leaders in the field. Analysis of medical terminology and development of a field vocabulary.

*For Advanced Undergraduates*

## BALTIMORE CAMPUS

### ANAT. 103. HUMAN ANATOMY. (8½)

First and second semesters. Prerequisites, Zool. 1, 2, 5. The student is given an opportunity to develop a basic concept of the morphology of the human body through a correlation of histology, gross anatomy and neuro-anatomy. Dissection of the human body including the brain is required.

### PATH. 105. PATHOLOGY. (2)

Second semester. Prerequisites, Anat. 103(a). Physiol. 101 taken concurrently. This course includes the study of the basic principles of disease and injury with their application to the various systems of the body. Special emphasis is placed on the locomotor system.

### PHYSIOL. 101. PRINCIPLES OF PHYSIOLOGY. (5)

First semester. Prerequisites, Zool. 1, 2, 5 and Chem. 1, 3. The lectures cover the major fields of physiology, including the following areas: central and peripheral nervous systems, neuro-muscular apparatus, heart and circulation, respiration, kidney and body fluids, gastrointestinal tract, endocrines and reproduction.

### PSYCH. 161. PSYCHOLOGY OF THE HANDICAPPED. (1)

First semester. Prerequisite, Psych. 5. This course is devoted to the consideration of human relations as applies to the practice of physical therapy. Emphasis is placed on observing, understanding and evaluating the personal and social factors affecting the handicapped.

### P. T. 102. PHYSIOLOGY OF EXERCISE. (1)

First semester. Prerequisites, Anat. 103, Physiol. 101. A consideration of the mechanism of muscular contraction and problems concerned with increasing efficiency of movement in motor activities and work.

### P. T. 104. FUNCTIONAL ANATOMY. (2½)

First semester. Prerequisites, Anat. 103, Physiol. 101. This course is primarily a consideration of the locomotor activity of the human body. It is designed to include observation and analysis of motion as it occurs in man under normal and pathological conditions.

### P. T. 106. PROFESSIONAL RELATIONS, ETHICS AND CLINICAL OBSERVATION. (1)

First and second semesters. A consideration of appropriate conduct related to personal and professional relations of the physical therapist.

### P. T. 107. PHYSICAL THERAPY THEORY AND TECHNIQUE I. (2½)

Second Semester.

#### (1) MASSAGE

Second semester. The theory, physiological effects and techniques of scientific massage as it is used in all aspects of physical therapy are discussed and administered.

(2) **HYDROTHERAPY**

The physics of water, cold and heat are reviewed. The various techniques of whirlpool, hot and cold applications, showers and underwater exercise in relation to various conditions are practiced and discussed.

(3) **BANDAGING**

In this course one learns the principles and practice of first aid and bandaging with particular emphasis on bandages for support and conformity.

**P. T. 108. PHYSICAL THERAPY THEORY AND TECHNIQUE II—THERMOTHERAPY AND ACTINOTHERAPY. (1½)**

Second semester. The basic physics and physiological effects of heat and ultra-violet are discussed. The student practices the therapeutic application of infra-red and ultra-violet lamps, diathermy, microthermy and ultrasonics.

**P. T. 110. PRINCIPLES OF PHYSICAL THERAPY APPLIED TO MEDICAL AND SURGICAL CONDITIONS. (2½)**

(1)—Dermatology

(2)—Medicine

(3)—Psychiatry

**P. T. 151. THERAPEUTIC EXERCISE. (5)**

First semester. A study of the principles and techniques of therapeutic exercise related to the prevention, correction and alleviation of disease and injury. This course includes manual muscle testing, muscle re-education, joint measurement, gait training and functional activities.

**P. T. 152. REHABILITATION. (3)**

Second semester. This course is designed to study the principles and practices employed in the comprehensive care and treatment program of the physically handicapped. It includes the evaluation of activities of daily living as well as the application and care of supportive devices.

**P. T. 153. PHYSICAL THERAPY THEORY AND TECHNIQUE III. (3)**  
**ELECTROTHERAPY**

First semester. This course includes lectures, demonstration and laboratory tests concerning the physical and physiological effects of low frequency, alternating and direct currents. The therapeutic and the diagnostic use of electricity and electromyography is discussed and practiced.

**P. T. 154. INTERPROFESSIONAL AND SOCIAL AGENCIES CORRELATION. (1)**

Second semester. A survey is made of allied fields and related social agencies and their specific role in total patient care.

**P. T. 155. NURSING PROCEDURES RELATED TO PHYSICAL THERAPY. (1½)**

Second semester. This course serves to acquaint the student with bedside, aseptic and isolation techniques and methods of handling acutely ill and chronically disabled patients.

**P. T. 156. CURRENT LITERATURE. (1)**

Second semester. This course is designed to acquaint the student with professional and scientific literature. It affords experience in presenting reports and in group discussion.

## DANCE

### P. T. 157. ADMINISTRATION AND CLINICAL OBSERVATION. (1)

Second semester. The organization and administration of a hospital and of a physical therapy department are presented.

### P. T. 158. CLINICAL EXPERIENCE. (6)

First and second semesters. During the period the student gains experience practicing physical therapy procedures in a hospital physical therapy department under the careful supervision of qualified physical therapists.

### P. T. 160. PRINCIPLES OF PHYSICAL THERAPY APPLIED TO MEDICAL AND SURGICAL CONDITIONS. (5)

First and second semesters. These lectures present to the students various conditions encountered in patients treated by the physical therapists. Specialists from various fields of medicine and surgery discuss the problems in their practice which are related to physical therapy with emphasis on indications for various treatment procedures.

- (1) Gynecology and Obstetrics
- (2) Neurology
- (3) Orthopedics
- (4) Pediatrics
- (5) Physical Medicine and Rehabilitation
- (6) Public Health
- (7) Surgery

## DANCE

### DANCE 32. INTRODUCTION TO DANCE. (3)

First and second semesters. A study of Dance as a form of Communication and as an art form. The course will include dance styles, theories, technique, and their relationship to other art forms. The course will also provide observation to productions.

### DANCE 52, 54. DANCE TECHNIQUES. (1, 1)

First and second semesters. Three hours a week. Laboratory fee, \$6.00. Introduction to techniques of modern dance, with simple approaches to composition.

### DANCE 56. SKILLS AND METHODS IN FOLK AND SQUARE DANCE. (1)

First and second semesters. One lecture and three laboratories a week. Laboratory fee, \$6.00. This course is designed to acquaint the student with basic skills in folk and square dance and to give theory of class organization, analysis, teaching techniques, and practice in "calling" for junior and senior high school programs.

### DANCE 58. SKILLS AND METHODS IN SOCIAL DANCE. (1)

First and second semesters. One lecture and three laboratories a week. Laboratory fee, \$6.00. This course is designed to acquaint the student with basic skills in Social Dance and to give theory of class organization, analysis and teaching techniques for junior and senior high school programs.

### DANCE 59. SKILLS IN FOLK, SQUARE AND SOCIAL DANCE. (1)

First and second semesters. Three hours a week. Prerequisite, P. E. 50. Laboratory fee, \$6.00. This course is designed to acquaint the student with the basic skills in social, folk, and square dance for use in schools and recreational groups.

**DANCE 60. DANCE COMPOSITION. (2)**

First and second semesters. Four hours a week. Laboratory fee, \$6.00. The study of dance content and relationship to form and style. Theory and laboratory problems in composition. Techniques in presenting dance materials.

**DANCE 70. INTERMEDIATE MODERN DANCE. (2)**

First and second semesters. Four laboratory periods a week. Prerequisites, P.E. 52, 54 or permission of instructor. Laboratory fee, \$6.00. Modern dance techniques. Compositional problems.

**DANCE 80. ADVANCED MODERN DANCE. (2)**

First and second semester. Four laboratory periods a week. Prerequisites, P. E. 52, 54, 70 or permission of the instructor. Laboratory fee, \$6.00. Continuation of P. E. 70 in more advanced form.

**DANCE 90. WORKSHOP. (1)**

First and second semesters. Three laboratory hours a week. Permission of instructor only. Laboratory fee, \$6.00. Planning, composition, and presentation of demonstrations. A total of 6 credits may be earned.

*For Advanced Undergraduates and Graduates*<sup>29</sup>

**DANCE 110. DANCE PRODUCTION. (3)**

First and second semesters. Prerequisites, P. E. 52, 54, 60, 70, 80, or equivalent. Planning of group and individual choreography. Aspects of dance production such as staging costumes, make-up for dancers, acquainting the student with elements of dance and theatre. Demonstration planning.

**DANCE 182. HISTORY OF DANCE. (3)<sup>29</sup>**

First and second semesters. The development of dance from primitive to modern times and the relationship of dance forms to patterns of culture. A historical survey of the changing place of dance in civilization. Research problems.

**DANCE 184. THEORY AND PHILOSOPHY OF DANCE. (3)<sup>29</sup>**

First and second semesters. The study of the basic theories and philosophies of dance. Investigation of form, content and structure in dance and in relationship to other arts. The role of dance in education.

**DANCE 192. PERCUSSION ACCOMPANIMENT AND MUSIC FOR DANCE. (2)<sup>29</sup>**

First and second semesters. One lecture and two laboratory hours per week. Techniques of percussion playing and its use as dance accompaniment are emphasized. Learning to use the instruments in composition and improvisation is stressed. Music for dance. Percussion scores.

---

<sup>29</sup> This course may be taken for graduate credit with the permission of the advisor. Students taking 100 level courses for graduate credit will be expected to carry out a special project.

## BASIC PHYSICAL EDUCATION COURSES

### BASIC PHYSICAL EDUCATION COURSES FOR NON-MAJOR MEN AND WOMEN

In the "General and Academic Regulations" (pps. 65-67) the basic requirements in Physical Education for men and women are stated under the section entitled "Physical Education" as follows:

All undergraduate men and women students who are registered for more than eight semester hours of credit are required to enroll in and successfully complete two prescribed courses in physical education for a total of two semester hours of credit. The successful completion of these courses is required for graduation. These courses must be taken by all eligible students during the first two semesters of attendance at the University, whether or not they intend to pursue a degree. Men and women who have reached their thirtieth birthday are exempt from these courses. The thirtieth birthday must precede the Saturday of registration week. Students who are physically disqualified from taking these courses must enroll in adaptive courses for which credit will be given. A transferring student who can meet the academic requirements of his college and the requirements of the University by completing 30 academic hours will not be required to register for physical education. Students with military service may receive credit for these courses by applying to the Director of the Men's Physical Education Program.

Students majoring or minoring in physical education, recreation, or health education may meet these requirements by enrolling in special professional courses.

The program of physical education offers the college student an opportunity to acquire skills, knowledges, and appreciations in a variety of physical and sports activities. Adequate participation now and in the future will contribute to more efficient physiological functioning, effective movement, improved human relations, and worthwhile use of leisure time. Students are urged to develop new skills as well as to select those in which they would like to have further experience.

The complete course offering for any one semester is listed in the "Schedule of Classes" for each semester. Special attention should be given to the time, place, and section of the activities. When selecting course for credit, consideration should be given to the following points:

**MALE STUDENTS:** All male students are required to take the basic program, P. E. 1, Orientation to Physical Education, the first semester in which they are enrolled in the University. During this course, a swimming skill test and a motor performance test will be given. If a student fails either test, he must select elementary swimming or basic motor fitness course, whichever may apply. If the student fails both tests, the preferred course selection is swimming. Other students may select any activity listed in P. E. 3 as their second semester activity.

## BASIC PHYSICAL EDUCATION COURSES

P. E. courses may be taken for credit beyond requirement or for audit. Each male student enrolled in required physical education will be furnished a red and black reversible T-shirt, black trunks, socks, supporter, and towel. Gymnasium shoes, and for some classes, sweat clothes must be furnished by the student.

At the end of each semester or upon withdrawal from the University each student must return his clothing to the equipment custodian or he will be billed for all items of clothing which are missing.

**UNIFORM:** Each woman student is expected to provide herself with gymnasium costume consisting of dark green bermuda shorts, white blouse, white socks and tennis shoes.

**ALL STUDENTS:** 1. A laboratory fee is assessed for all Physical Education courses.

2. All courses designated with an asterisk (\*) are co-ed courses with appropriate numbered courses combined to form a class.

3. Other courses are designated with special markings indicating that there is a prerequisite to that course. All such markings are explained with a footnote at the bottom of each page in the Schedule of Classes. Examples of prerequisites are: Swimming is a prerequisite to sailing and canoeing and a weekend field trip is required for camping, etc.

4. A special fee of \$26.00 is assessed for riding.

**WOMEN STUDENTS:** All women students will select the activity in which they would like to participate. However, a swimming skill test will be given to all students and those not passing will be assigned an elementary swimming class in P.E. 4. The other students will continue in their chosen activity. The second course may be selected from either P.E. 2 or P.E. 4.

In brief, those students who are not proficient in swimming must complete one course in P.E. 4.

The Basic Program Courses are designated as:

- P. E. 1 Orientation to Physical Education
- P. E. 2 Physical Education Activities
- P. E. 3 Basic Physical Education
- P. E. 4 Swimming
- P. E. 10S Physical Activities (Summer)

## REQUIRED HEALTH EDUCATION FOR MEN AND WOMEN

All freshmen are required to complete one semester of Science and Theory of Health (Hea. 5) for graduation. Students who demonstrate proficiency in Science and Theory of Health on a test to establish credit may be

## REQUIRED HEALTH EDUCATION

exempted from Health 5. Transfer students who do not have credit for Health 5, or its equivalent, must complete it or take it until graduation, whichever occurs first. This semester course is designed to meet the functional health needs and interests of college men and women. The basic units of instruction have been evolved from present day scientific backgrounds. It is hoped that through this health course the student will be better able to develop sound attitudes, habits and knowledge that will facilitate a more effective type of everyday living. Audio-visual aids, reading, reports, guest speakers, and lectures help to enrich the class discussions. The University environment, the personal and group adjustment which the students must make are considered to form the core of this course.

Men and women who have reached their thirtieth birthday are exempt from Health 5.

Military Service does *not* exempt the student from the Health 5 requirement.

### HEA. 5. SCIENCE AND THEORY OF HEALTH. (2)

First and second semesters. A course concerned primarily with sound health knowledge attitudes and skills as they apply to the individual. The major subjects dealt with in this course are: mental health and social adjustment; human reproduction and sex education; organic efficiency; ecological and environmental health hazards; and the need for health education and community action from world to local levels.

## STUDENT ORGANIZATIONS SPONSORED BY THE COLLEGE

**PHI ALPHA EPSILON:** Honorary Society of the College of Physical Education, Recreation, and Health.

The purpose of this organization is to recognize academic achievement and to promote professional growth by sponsoring activities in the fields of physical education, recreation, health, physical therapy, and related areas.

Students shall qualify for membership at such time as they shall have attained junior standing in physical education, health, recreation, or physical therapy, and have a minimum overall average of 2.7 and a minimum professional average of 3.1. Graduate students are invited to join upon passing the Master's qualifying examinations.

The organization is open to both men and women.

**MAJORS' CLUB:** All students enrolled in the college are eligible for membership in this organization. It conducts various professional meetings, brings in speakers and promotes various co-recreational activities. It has sponsored trips to District and National conventions of the American Association for Health, Physical Education, and Recreation, and is chartered as a student major club of that organization.

**SIGMA TAU EPSILON:** This society, founded in 1940, selects those girls who have attained an overall 2.5 average and demonstrated outstanding leadership, service and sportsmanshiplike qualities in the organization and activities of the Women's Recreation Association and its affiliated groups.

**AQUALINERS:** This synchronized swimming club is open to all men and women registered in the University. Through weekly meetings the group concentrates on additional stroke perfection, individual and group stunts, diving, and experimentation with various types of accompaniment and choreographic techniques. An original water show is presented each spring and several demonstrations are given each year. Tryouts are held twice a year—once at the beginning of the fall Semester, and again after the water show during the spring semester.

**UNIVERSITY OF MARYLAND RECREATION SOCIETY:** In the fall of 1959 the University of Maryland Recreation Society was formed by the undergraduate and graduate major and minor students of the College. The Society, an affiliate of various national recreation organizations, provides opportunities for university and community service, for rich practical experience, and for social experiences for those students having a mutual professional recreation interest.

**MODERN DANCE GROUPS:** Men and women interested in modern dance concentrate on dance techniques and individual and group compositions. Members present a spring concert and perform in demonstrations on and off campus. Dance groups meet weekly.

**GYMKANA TROUPES:** The Gymkana Troupe includes men and women students from all colleges that wish to express themselves through the medium of gymnastics. These individuals coordinate their talents in order to produce an exhibitional performance that has been seen in many places including Bermuda, Iceland, Azores, Idaho, Montana, and the Eastern Seaboard of the United States. The organization has three principal objectives: (1) to provide healthful, co-recreational activities that provide fun for the students during their leisure hours; (2) to promote gymnastics in this locality; and (3) to entertain our students and people in other communities.

This organization is co-sponsored by the Physical Education Department and the Student Government Association; and it welcomes any student, regardless of the amount of experience, to join and to have fun.

**INTRAMURALS FOR MEN:** The Intramural Department offers an extensive opportunity for all men to participate in a recreational program of either individual or team sports. A variety of activities are available to fill the student's leisure time and develop skills which may be carried over into later life. Also, many desirable attributes, such as fair play, leadership, teamwork and sportsmanship, are encouraged and developed by the student participating in the program.

## STUDENT ORGANIZATIONS

Leagues and tournaments are conducted in the following sports: touch football, horseshoe pitching, tennis, cross country, track and field, basketball, table tennis, badminton, boxing, wrestling, bowling, volleyball, swimming, foul shooting and softball.

Management and officiating in intramural sports are conducted by students majoring in physical education under the supervision of the Director of Intramurals and under policies and regulations established by the Intramural Council.

**WEIGHT LIFTING CLUB:** The University of Maryland Weight Lifting Club is open to all students and faculty for exercise with the weights throughout the week during all hours that Cole building is open.

The University of Maryland Olympic Barbell Club is a more highly organized group of the original club. It is recognized by the Student Government Association. Bi-monthly meetings are held, which assist in leadership, offer clinics and demonstrations, etc.; participate in competition, and earn awards of recognition.

**WOMEN'S RECREATION ASSOCIATION:** *All women students of the University are members of the Women's Recreation Association*, an affiliate of the Athletic and Recreational Federation of College Women. Under the leadership of its elected student officers and representatives and appointed sports managers, the WRA sponsors a full program of intramural, extramural, and interest group activities. These activities seek to develop new interests and skills for leisure-time enjoyment, provide opportunities for continuing both old and new interests, and provide a democratic atmosphere for educational leadership experiences. Included are free and tournament play in archery, badminton, basketball, bowling, fencing, field hockey, golf, softball, swimming, table tennis, tennis, and volleyball; social events; and co-recreational activities in bowling, badminton, volleyball. Intramural tournaments are organized through the dormitory, sorority, and "day dodger" groups of the University. Sports Days and Play Days with other colleges and universities enable the more skilled students to participate with others of similar abilities. Opportunities are also provided for officiating experience and for the earning of official WNORC ratings in basketball, field hockey, swimming, and volleyball.

Various special groups and clubs interested in recreation exist on campus outside the Women's Recreation Association program and offer rich opportunities for the development of other recreational interest. Some of these are the Terrapin Trail Club, Chess Club, Gymkana Troupe, Sailing Club, Ski Club, and musical and dramatic groups.

# The Faculty

## *Administrative Officer*

FRALEY, Lester M., *Professor and Head, Department of Physical Education, and Dean of the College of Physical Education, Recreation and Health*  
A.B., Randolph-Macon College, 1928; M.A., Peabody College, 1937; Ph.D., 1939.

## *Professors*

EYLER, Marvin H., *Professor of Physical Education*

A.B., Houghton College, 1942; M.S., University of Illinois, 1948; Ph.D., 1956.

HARVEY, Ellen E., *Professor of Physical Education and Recreation*

B.S., New College, Columbia University, 1935; M.A., Teachers College, Columbia University, 1941; Ed.D., University of Oregon, 1951.

HUMPHREY, James H., *Professor of Physical Education and Health*

A.B., Denison University, 1933; A.M., Western Reserve University, 1946; Ed.D., Boston University, 1951.

HUSMAN, Burris F., *Professor of Physical Education*

B.S., University of Illinois, 1941; M.S., 1948; Ed.D., University of Maryland, 1954.

JOHNSON, Warren R., *Professor of Physical Education and Health*

B.A., University of Denver, 1942; M.A., 1947; Ed.D., Boston University, 1950.

## *Associate Professors*

CLARKE, David H., *Associate Professor of Physical Education*

B.S., Springfield College, 1952; M.S., 1953; Ph.D., University of Oregon, 1959.

CRONIN, Frank H., *Associate Professor of Physical Education; Head Golf Coach*

B.S., University of Maryland, 1946.

KEHOE, James, *Associate Professor of Physical Education, Director of Intramurals, and Head Track Coach*

B.S., University of Maryland, 1940.

LATIMER, Ruth M., *Associate Professor of Physical Therapy*

B.S., Westhampton College, University of Richmond, 1945; C.P.T., U. S. Army Hospital, 1946; M.S., Medical College of Virginia, 1952.

MADDEN, Dorothy G., *Associate Professor of Physical Education*

A.B., Middlebury College, 1936; M.A., Syracuse University, 1937; Ph.D., New York University, 1961.

TOMPKINS, Theron A., *Associate Professor of Physical Education*

B.S., Eastern Michigan College of Education, 1926; M.A., University of Michigan, 1939.

## FACULTY

WOODS, Albert A., *Associate Professor of Physical Education*  
B.S., University of Maryland, 1933; M.Ed., 1949.

### *Assistant Professors*

CAMPBELL, William R., *Assistant Professor of Physical Education and Head Swimming Coach*

B.S., Springfield College, 1949; M.Ed., 1953.

CHURCHILL, John W., *Assistant Professor of Recreation*

B.S., Cortland State College, 1958; M.S., University of Illinois, 1959.

FREUNDSCHUH, J., *Assistant Professor of Physical Education*

B.S., University of Alabama, 1953; M.A., 1954.

HOWARTH, Louise S., *Assistant Professor of Physical Education*

A.B., Breanau College, 1928; M.Ed., University of Minnesota, 1949.

INGRAM, Anne G., *Assistant Professor of Physical Education*

A.B., University of North Carolina, 1944; M.A., University of Georgia, 1948;  
Ed.D., Teachers College, Columbia University, 1962.

JONES, Herbert L., *Assistant Professor of Health Education*

B.S., Wisconsin State College, 1954; M.S., University of Wisconsin, 1957;  
H.S.D., Indiana University, 1964.

KELLEY, David L., *Assistant Professor of Physical Education*

A.B., San Diego State College, 1957; M.S., University of Southern California, 1958; Ph.D., 1962.

KESLER, Ethel, *Assistant Professor of Physical Education*

B.S., Woman's College, University of North Carolina, 1949; M.S., Wellesley College, 1953.

KRAMER, George P., *Assistant Professor of Physical Education*

B.S., University of Maryland, 1953; M.A., 1956.

KROUSE, William E., *Assistant Professor of Physical Education and Head Wrestling Coach*

B.S., University of Maryland, 1942; M.Ed., 1949.

NESSLER, Joan, *Assistant Professor of Physical Education*

B.A., Wellesley College, 1951; M.A., State University of Iowa, 1952; Ph.D., Pennsylvania State University, 1961.

SANDERSON, Eleanor B., *Assistant Professor of Physical Education*

B.S., East Carolina College, 1955; M.Ed., Woman's College, University of North Carolina, 1959.

STEEL, Donald H., *Assistant Professor of Physical Education*

B.S., Trenton State Teachers College, 1955; M.A., University of Maryland, 1957; Ph.D., Louisiana State University, 1964.

TIFFT, Margaret, *Assistant Professor of Health Education*  
B.S., Ohio State University, 1946; M.A., Columbia University, 1948.

### *Instructors*

ARRIGHI, Margarite A., *Instructor of Physical Education*  
B.S., Westhampton College, University of Richmond, 1958; M.A., University of Maryland, 1962.

BAKHAUS, Pamela M., *Instructor of Health Education*  
B.S., Central Michigan University, 1964; M.S., Indiana University, 1966.

BUNDSCHUH, Ernest L., *Instructor in Physical Education*  
B.S., University of Alabama, 1959; M.A., 1960.

CHASEY, William C., *Instructor of Physical Education*  
B.S., Springfield College, 1962; M.A., East Carolina State College, 1965.

CHRISTENSEN, Carl S., *Instructor of Health Education*  
B.S., Springfield College, 1953; M.S., University of Illinois, 1954.

HOLDEN, Beverly K., *Instructor of Physical Education*  
B.S., B.A., Shepherd College, 1957; M.Ed., Miami University, Ohio, 1958.

JACKSON, Elton S., *Instructor of Physical Education*  
B.S., University of Maryland, 1958.

JOHNSON, Ronald C., *Instructor of Physical Education*  
B.S., Baylor University, 1956; M.S., 1958.

KAHNERT, John H., *Instructor of Health Education*  
B.A., University of California, 1957; M.A., University of Maryland, 1961.

McKNIGHT, Dorothy B., *Instructor of Physical Education*  
B.S., Ursinus College, 1957; M.Ed., Temple University, 1960.

MYERS, Roderick W., *Instructor of Physical Education*  
B.A., Ohio Wesleyan College, 1961; M.A., University of Maryland, 1964.

ROSEN, Meriam L., *Instructor of Dance*  
B.S., University of Illinois, 1948; M.A., University of Maryland, 1965.

SCHOFER, Marcia E., *Instructor of Dance*  
B.S., University of Maryland, 1962; M.A., University of California, 1964.

SCHUTT, Margaret E., *Instructor of Health Education*  
B.S., Teachers College, Columbia University, 1945; R.N., St. Elizabeth's Hospital, 1941.

WILLIAMS, Diane R., *Instructor of Physical Education*  
B.S., Women's College, University of North Carolina, 1961; M.A., San Jose State College, 1965.

WILLIAMS, Melvin H., *Instructor of Physical Education*  
B.S., East Stroudsburg State College, 1962; M.Ed., Ohio University, 1963.

## FACULTY

### *Lecturers*

COBEY, W. W., *Associate Professor, Director of Athletics*  
A.B., University of Maryland, 1930.

MILLER, Catherine M., *Lecturer in Health Education*  
B.S., State University Northern Illinois, 1956., M.A., Colorado State College,  
1959.

MILLIKAN, H. A., *Associate Professor and Head Basketball Coach*  
B.S., Oklahoma A. & M. College, 1943.

WYRE, Alfred J., *Head Trainer*







